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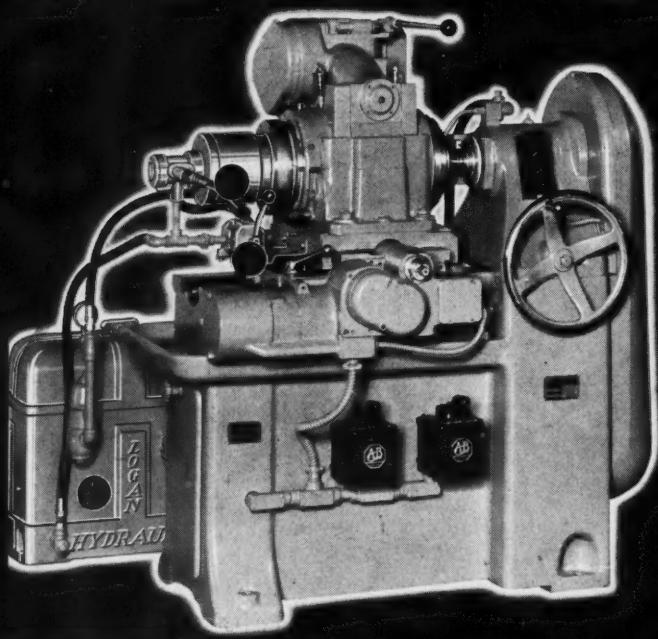
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LOGANSPORT, INDIANA

MODERN Machine Shop

JUNE, 1942
VOLUME 15 • NUMBER 1

Contents

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MODERN Machine Shop

CINCINNATI, OHIO

JUNE, 1942

VOL. 15, No. 1

We Present ---

— as the opening article this month the story of the new aviation engine plant, Buick Motor Division, General Motors Corporation. Highlighting this article are some of the more interesting features of this great, modern aircraft engine manufacturing plant, together with details of some of the machining operations. Watch for the second installment of this article in the next issue.

— on page 122—an interesting review and outline of the methods employed in a large American city to train qualified workers for defense production in a minimum of time.

— on page 138—an interesting story of the conversion of the manufacturing facilities of a merry-go-round builder for making bomber parts.

— on page 146—helpful details and recommendations on the extinguishing of magnesium and incendiary bomb fires with coal-tar pitch.

— on page 154—a brief article presenting hints on the conserving and salvaging of equipment and supplies in the grinding room.

— on page 160—a number of useful and interesting items under the heading "Modern Equipment at Work."

— the regular features "Ideas From Readers," "Tools for National Defense," and "New Shop Equipment" reviews.



Entrance to Administration Building
Buick Aviation Engine Plant

By HOWARD CAMPBELL
Editor, Modern Machine Shop

New Buick Engine Plant in Production

In this article the author presents some of the more interesting features of a great, modern aircraft engine manufacturing plant, together with details of some of the machining operations

ONE more great engine plant is now in production in mid-west America, turning out warplane engines for use in our Air Corps' fighting planes. In the approximate time that it takes for a crop of wheat to mature, the Buick Division of General Motors Corporation has brought to completion one of the largest projects in the national war production program and readied that project for the mass production of Pratt & Whitney engines.

The project occupies a site of over

100 acres in the middle west, on what was at the start just a spot on the open prairie. While thousands of tons of concrete were being poured for the vast foundations — 410,000 bags of cement were required to complete the buildings, and excavations totalled 5,500,000 cubic feet — a railroad was built to the construction scene over which trainloads of structural steel soon were rolling.

As the steel network rose into the sky, the steelworkers were followed by bricklayers, stone masons, gla-

ziers, and workers in a score of other construction trades who built up the walls, roofs, windows and floors according to a preconceived plan the most important element of which was time.

When completed, the structure had taken 10,000 tons of structural steel, 7,000,000 wood flooring blocks, 3,000,000 bricks, and 186,000 square feet of steel sash, while 300,000 pounds of copper went into power lines alone and 250 miles of electric wire and cable were required for the various types of wiring required.

The main factory building is one story high with 10 monitors extending the entire length of the building. The roof is of pre-cast cement tile, covered with tar and gravel. In winter the building is heated by overhead unit heaters of the projection type, and is divided into four zones with zone thermostats that regulate artificial heat in accordance with the amount required to maintain an even temperature. The manufacturing area is artificially lighted by fluorescent lighting units which

provide a light intensity of 40 to 45 foot-candles at working height.

Employees' entrance to the manufacturing building is through two transverse corridors in the basement with access to the various departments by means of 10 stairways at given points throughout the plant. All factory employees enter and leave through these corridors and all wash rooms, coat rooms, and time clocks are located in the basement.

Also located in the basement is an air conditioned cafeteria which is regarded as one of the most modern of its kind, being equipped to serve several thousand people, 2,000 at a sitting. Other space leading off the basement corridors is occupied by additional lunch rooms, service rooms, fan rooms, refrigeration equipment and utilities.

The personnel building, which houses a modern hospital, personnel, and employment departments, is a one-story brick, steel and concrete structure situated a distance from the main buildings and near a corner of the plant area.

Fig. 1—Master Mechanic's Division of Main Offices of New Buick Aircraft Engine Plant



The plant is served by nearly two miles of railroad siding, with under-shelter railroad loading and shipping docks located within the manufacturing buildings. Truck shipping and receiving docks are likewise constructed for enclosed loading and unloading.

The entire plant area is illuminated at night by a road lighting system and is surrounded by a fence. A gate house is located at each of the seven gates and gates must be entered single file. Guard towers are also located at strategic points. Parking space is provided for 3,500 cars. The plant was designed by Albert Kahn, Detroit. Total cost of the plant and equipment was approximately \$41,000,000.

The equipment of the main manufacturing building is a delight to the eye of the person who has been

trained to appreciate it—long rows of machine tools of the most modern type, equipped with tools, jigs, and fixtures designed especially for the individual jobs by tool engineers who are specialists on this work. Some of the more interesting of the equipment will be described here.

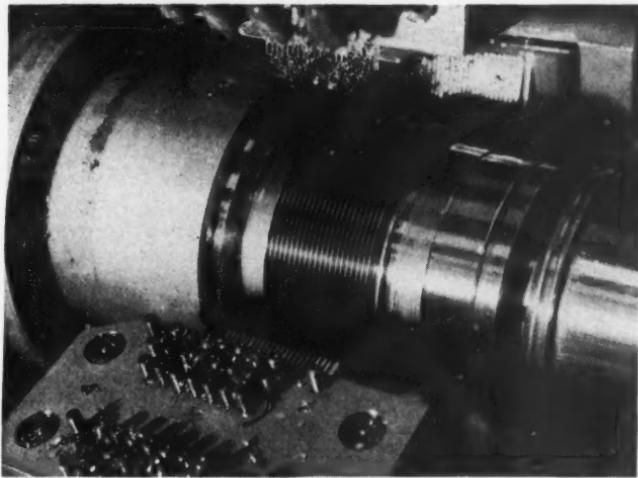
The factory offices occupy three floors of a modern administration building. One section of one floor, showing the Master Mechanics' Division, is shown in Fig. 1. Here, as throughout the offices, fluorescent lighting contributes to the quantity and quality of work by supplying an adequate amount of light of "day-light" quality.

One of the more interesting of the machining operations is that of turning all diameters and facing the cylinder barrel, shown in process in Fig. 2. The machine is an eight-

Fig. 2—Turning and Facing the Cylinder Barrel. This Eight-Station Machine Operates Automatically, Speeding Production on These Important Parts



Fig. 3—Machining the Fins on the Cylinder Barrel. The 21 Fins are Cut Simultaneously with a Gang Tool



station Bullard Mult-Au-Matic, seven stations of which are used for machining while the eighth station is used to load and unload the workpieces. The loading station is shown at the front in the illustration.

The several turning and facing operations are divided so as to provide an equal amount of work for all stations, thus reducing the time required to the minimum for the complete operation. In this operation approximately 0.015 inch of stock is left on all surfaces to be removed in subsequent operations.

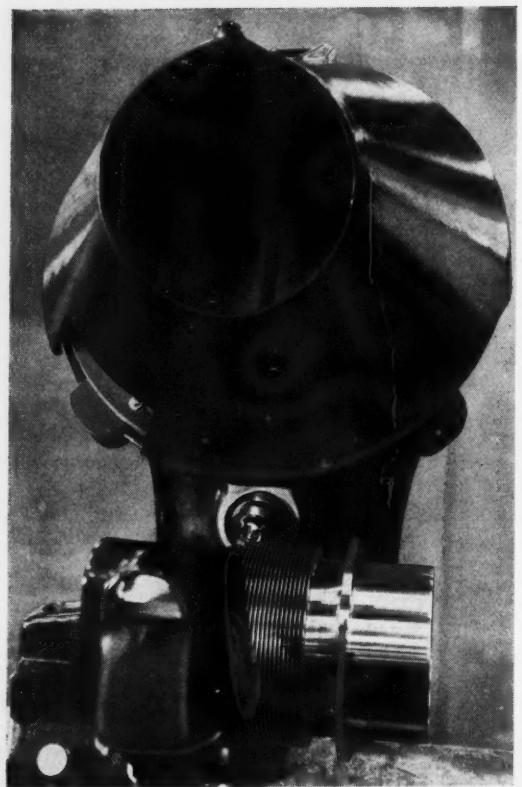
After the turning operation has been completed, a series of radial "fins" are cut in the periphery of the barrel to aid in keeping the engine cool while it is in operation. A Fay Automatic Lathe is used for this operation, and the barrel is held on an air-operated arbor while the tools are cutting the 21 fins specified in the design.

The fins are cut simultaneously by a set of 22 blades held in a tool block as shown in Fig. 3. Three sets of tools are used on this operation, the first set removing all but 0.015 inch of stock on each side of each fin, the second set finishing one side of each fin to the required thickness of 0.020 inch each and one-half of the radius, and the third set finishing the other side of the fin and the balance of the

radius in the bottom of each of the grooves between the fins. The operation is necessarily done at slow speed, and the tools are flooded with cutting oil during the operation.

Considering that the fins on the cylinder barrel must not only be machined to the correct thickness but also must be spaced accurately, the finished barrel is checked for accuracy in the J & L Comparator shown in Fig. 4. The barrel is set up in the instrument as shown in the illustration and a strong beam of light is projected across the surface in such manner as to cast a magnified shadow onto the ground glass which can be seen enclosed by the hood at the top of the instrument.

Inasmuch as the magnification is 16 : 1, a pattern drawn to this scale is laid out on the ground glass and the magnified image of the fin as presented on the glass must not exceed the limits of the pattern. Thus the pattern indicates the limit allowable for thickness, for straightness and parallel, and for the radii in the bottoms of the grooves. Any variation from the limits of the pattern on the ground glass is sufficient



cause for rejection.

Now that the barrel is very near to completion, before it is threaded and ground in the bore it is given a "Magnaflux" test to discover any possible flaws in the structure of the metal. This operation, shown in process in Fig. 5, consists in magnetizing the barrel and then immersing it in a bath of thin oil containing, in suspension, a quantity of fine particles of magnetic iron oxide. Upon removing from the bath, the barrel is wiped clean and then it will be found that, wherever a crack or other flaw exists, a black line of iron oxide will be

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Fig. 4 (Left)—The Thickness and Spacing of the Fins on the Cylinder Barrel are Checked for Accuracy in this J & L Comparator

Fig. 5 (Below)—Each Barrel is Given the "Magnaflux" Test to Make Sure that it is Free from Cracks or Flaws

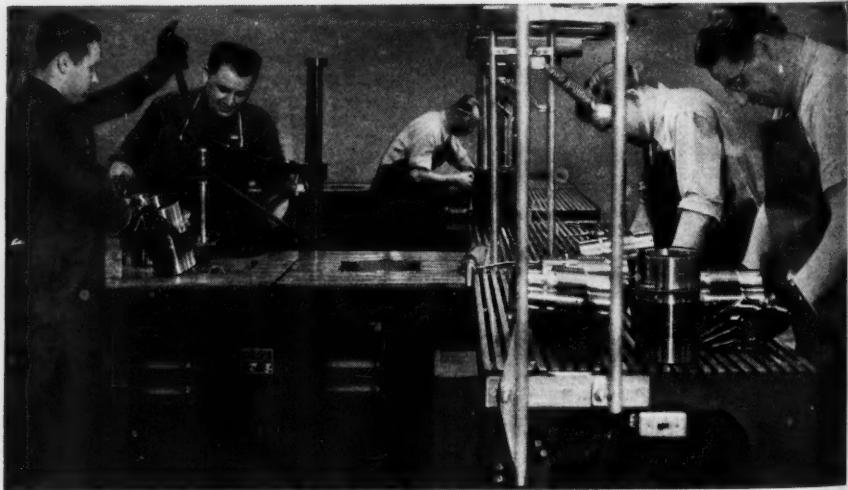
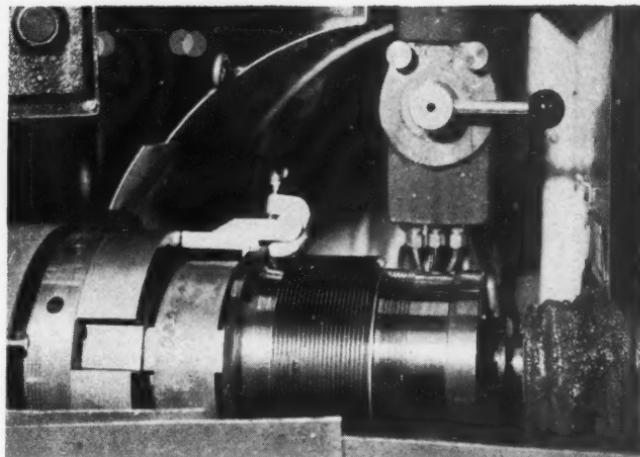


Fig. 7 — The Thread for the Cylinder Head is Produced by Generating with a Grinding Wheel. Each Thread is Accurate within 0.0002 Inch on the Diameter and within 30 Seconds on the Angle



found.

Cracks that are too small to be discovered by examination with a microscope of 100 diameters are easily detected by the Magnaflux method. A crack less than a hundredth of an inch long and half a thousandth deep is readily made visible. This method of inspection is applied to a number of the more important parts that go into the construction of the modern airplane

engine, thus precluding the possibility of failure in service due to defective parts.

Cylinder barrels are ground on Bryant Chucking Grinders of the type illustrated in Fig. 6. Here the workpiece is held in an air-operated chuck in which it is revolved in one direction while the grinding wheel rotates at a high rate of speed in the opposite direction. At the same time the spindle is fed forward and back through the bore.

Upon each return of the spindle

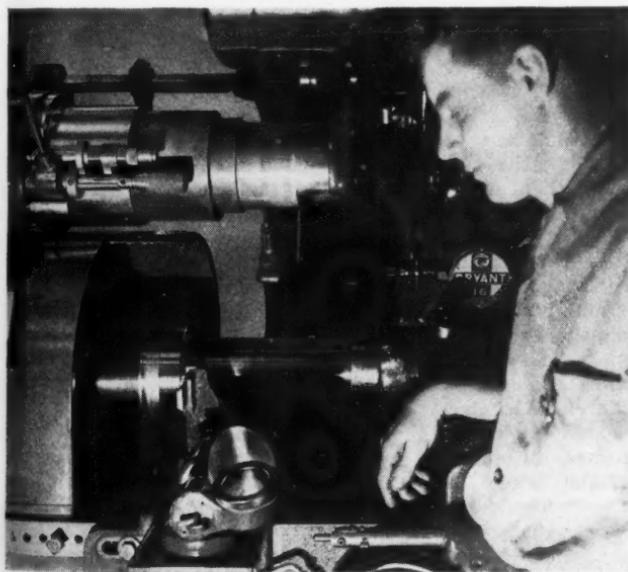


Fig. 6 — The Bore in the Cylinder Barrel is Finished to Size by Grinding in the Bryant Internal Grinder. The Machine Stops when Correct Size is Obtained

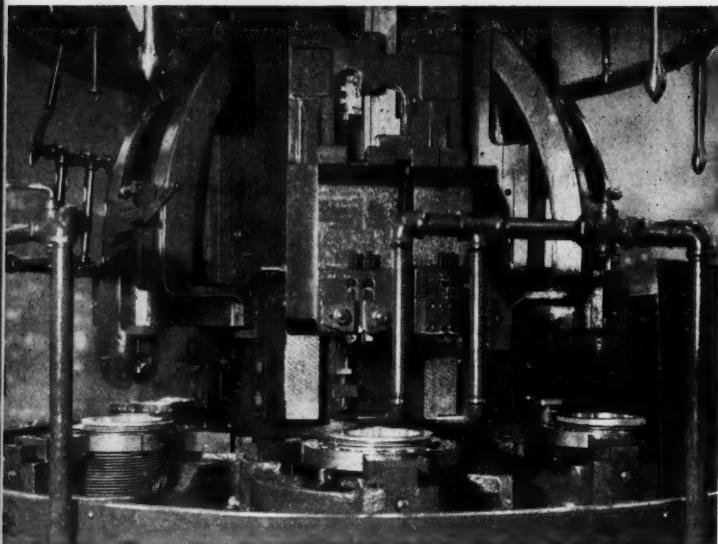


Fig. 8 — Cylinder Heads are Machined in this Six-Station Mult-Au-Matic

The spindle is automatically withdrawn from grinding position to wheel dressing position, the wheel is dressed automatically, and the wheel is automatically returned to the working position. The amount dressed off the wheel is compensated

for automatically, and the wheel is fed in automatically until the limit of size is reached. When the thread is finished, the wheel spindle automatically moves to dressing position and the machine stops. Correct size is determined by a special Johnson roll gage.

Cylinder heads are machined in the Bullard Mult - Au - Matic machine shown set up in Fig. 8. This is a six-station machine, one station being used to load and unload and five working stations to complete the boring, doming, chamfering, facing and turning pilot. Limits allowable on the diameter of the bore are plus or minus 0.002 inch.

As can be seen from a study of the boring tool in the station at the left in the illustration, the cutting tools are held rigidly so that absolute accuracy can be obtained.

The illustration Fig. 9 is a close-up view showing the drilling of the cylinder head. The machine is a five-way Kingsbury Special Drilling Machine equipped with multiple spindle heads on each spindle. In each of

after a cut forward and back through the bore the diameter of the circle in which it operates is increased so that the diameter of the workpiece will be increased in the following cut, and this feed is maintained until the specified diameter is reached, at which point the machine stops feeding automatically. A tolerance of plus or minus 0.001 inch is permitted on this diameter.

The cylinder heads, which are of aluminum, are assembled to the cylinder barrels by screwing them on to threads that have been ground in the periphery of the cylinder barrels. This thread must be accurate on the diameter within 0.004 inch and on the angle within plus or minus 5 minutes, in view of which the thread is generated by grinding as shown in Fig. 7. The machine is a Jones & Lamson Automatic Thread Grinder, equipped with an air chuck by which the workpiece is clamped automatically. The face of the wheel is dressed to the required angle and the accuracy is maintained by the use of an automatic wheel dresser.

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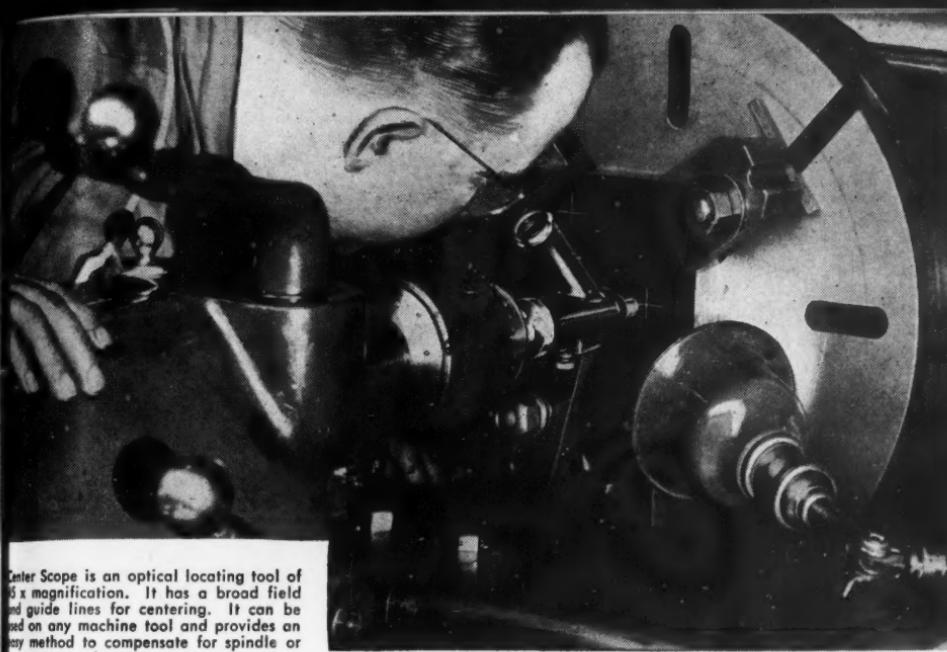
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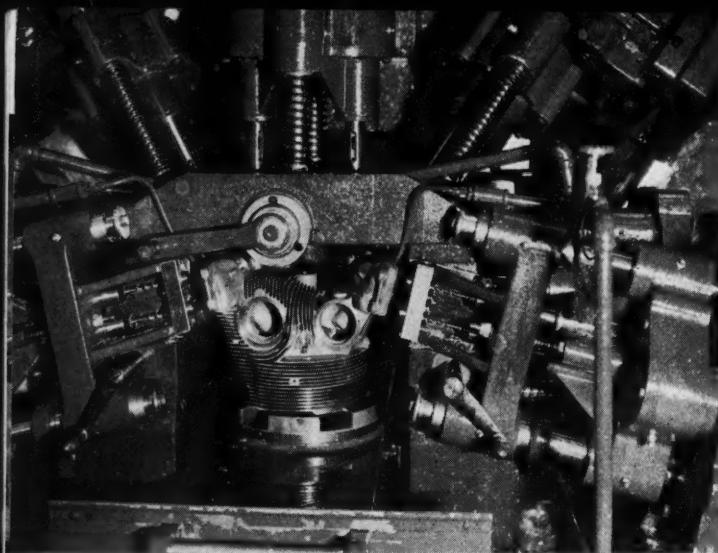


Fig. 9—A Five - Way Drilling Machine of Special Design, Equipped with Multiple Heads on Each Spindle, is Used to Drill the Holes in the Cylinder Head

the positions lower on the left and right sides two drills are used to drill $\frac{1}{4}$ -inch holes in the valve rocker housing; in each of the two upper positions holes are drilled and chamfered for the ears, and in the top position four spindles are used to drill holes in the top of the head. The head is held in position by a cam-operated clamp.

Illustrated in Fig. 10 is the set-up for drilling, reaming, tapping, and finish counterboring the spark plug

holes in the cylinder head. The machine is a five-spindle Natco and the heads are clamped into a fixture on an indexing table. In the first position

the head is drilled; in the second the hole is rough counterbored; in the third it is semi-finish counterbored; in the fourth the hole is finish counterbored and in the fifth the hole is tapped.

As only one spark plug hole is finished up to this point, the head is reversed in the fixture and the opposite side is finished in the same manner. An unusually interesting feature of this operation is the design of the tap, which is $\frac{3}{4}$ -inch 16-thread, left hand spiral. The spiral tap has been found to cut better in such metals and alloys as the metal of which

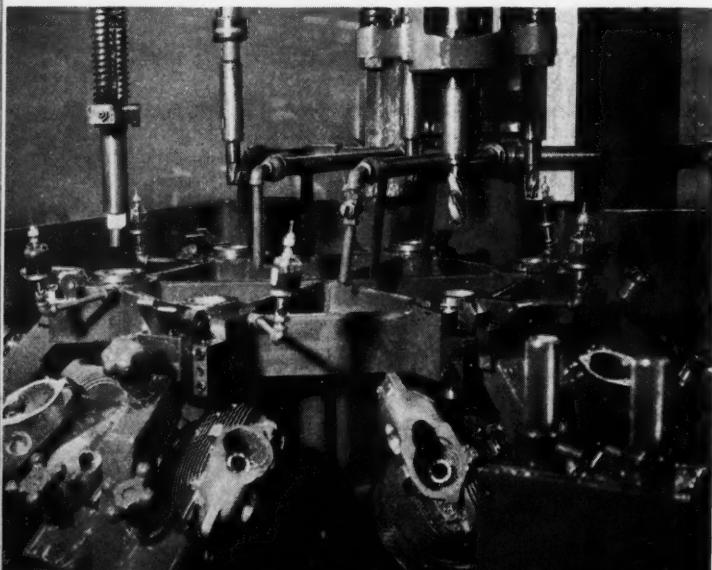


Fig. 10 — The Spark Plug Holes in the Cylinder Head are Drilled, Reamed, Tapped, and Finish Counterbored in this Five - Spindle Natco Multiple Drilling Machine

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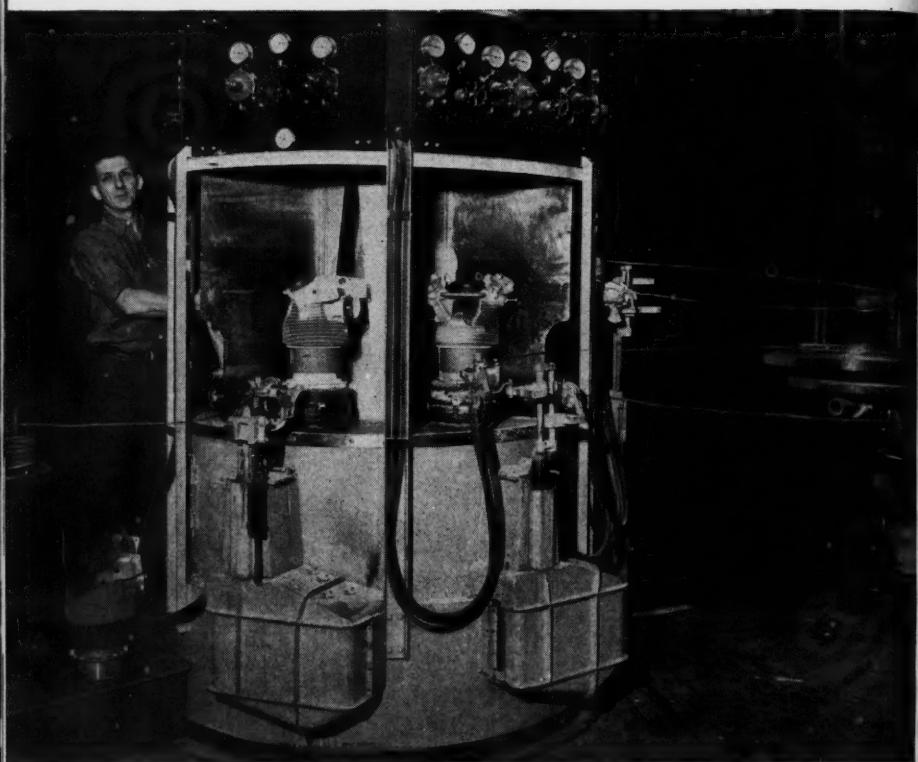


Fig. 11—The Finished Cylinder Head is Sprayed with a Coating of Molten Aluminum which Seals It against the Action of the Elements

these heads are made, the spiral flutes also tending to clear themselves of chips more readily than straight flutes.

After the machining operations on the cylinder head have been completed, each head is subjected to a "metallizing" process in which it is given a coating of aluminum to protect it from the elements—especially salt air and spray. To apply this coating, the head is set up on a spindle in one of the stations on the six-station automatic metallizing machine shown in Fig. 11, where it is slowly carried around the machine on the rotating table while being re-

volved on the spindle and reciprocated a short distance vertically.

While the head is thus traveling and revolving at the same time, it receives a spray of hot aluminum from each of the eight spray guns located around the machine. Each gun is practically a combination of a torch and a wire-feeding mechanism, and to each gun is attached an air hose, an oxygen line, and the end of a coil of aluminum wire. In operation, the gun feeds the aluminum wire automatically into the flame of the oxygen torch which melts it into a liquid that can be blown by the

(Continued on page 156)

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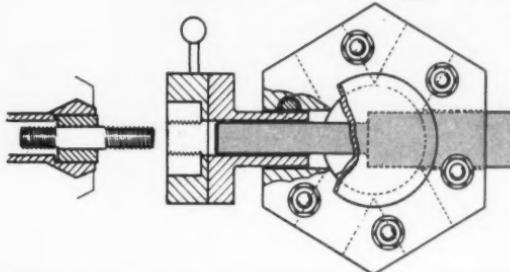
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Operator Snyder makes a stock stop and sets it in a hex turret station. It can be adjusted to any length thread desired. Then little attention need be paid to endwise location of work piece in the chuck. Die head and hex turret feed forward until trip opens and chasers release. No time lost for indexing and back-indexing to position the next stud in the collet.

Hundreds of resourceful operators are sending their "Ideas for Victory" to Warner & Swasey to be published in "Blue Chips," a newsy shop bulletin sent free to turret lathe operators' homes. Make sure your operators—old timers and learners—are on the list to get "Blue Chips." They'll enjoy it and profit through reading it. Write

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FASTER, FOR LESS... WITH A
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Ray F. Kuns, Coordinator of National Defense Training, Cincinnati Vocational Schools, in conference with W. S. Dickson, Supervisor of National Defense Machine Shop Training

By
BARTLETT WEST

Training Workers for Defense Production

An Outline of the Methods Employed in a Large American City to Produce Qualified Defense Workers in a Minimum of Time

THE war in which this country is now engaged is a war of production, the outcome of which will be determined by the ability of the winner to get his supplies to the front quickest and in the largest quantities. America's available resources are probably greater than those of any other nation, but we have to remember that America's antagonists have been preparing for this war for many years, and in those years they have built up reserve supplies of war materials which they have believed would enable them to win before America could get organized and into production on a war basis.

America has, therefore, been put to the necessity of trying to fight a war, build new factories, and build up stocks of war materials at the same

time. It was inevitable that the supply of trained and experienced mechanics should be inadequate, and at the beginning of the emergency it became apparent that provision would have to be made to augment the available supply through an organized training program.

The city of Cincinnati has been much concerned with this problem, due both to the fact that it is a great machine tool manufacturing center and that it is the location of many other industries now engaged in defense production. Among these is the great Wright aircraft engine plant, said—as it went into production—to be the largest plant in the world under one roof.

To determine what skills were most needed in the Cincinnati area,



Related Training Class in Session. Here the Trainee Learns the Principles of His Task, Shop Mathematics, Measuring Instruments, and So On

a survey was made which indicated that the greatest need existed for machinists, machine tool operators, and assemblymen. But a skilled mechanic cannot be turned out in a few weeks, and the need for skilled help has been urgent. To crystallize action, vocational school authorities and industrial executives settled on a program of training whereby it was proposed to produce, in a minimum of time, semi-skilled mechanics or operators who could function efficiently on at least one type of ma-

chine or one bench operation. A maximum of 300 hours has been set as the goal for training such an operator, and the results have justified the plan.

Trainees

The majority of the trainees are supplied through the United States Employment Service. Employers who have openings send requests for workers to the United States Employment Service Office, from which these requests are relayed to the

Here a Class of Women is Learning Drill Press Operation



schools. All applicants must apply at the Service Office first. If an applicant seems to come within the requirements as to physical and mental ability, the bureau sends him to the Vocation School office. There he is interviewed the second time to discover the extent of his previous training, if any, and any special

ditional time. Aside from the results of the two tests, the applicant's experience in allied work, his high school or college or technical school training and other factors are taken into consideration in determining whether or not the applicant should be afforded an opportunity to take the training.



Planer and Shaper Department of Cincinnati National Defense Training Schools. The Instructor Watches Each Trainee to Make Sure That he Performs his Operation Correctly

qualifications that might make him especially useful on a given type of work. No restrictions are placed on the selection of trainees except physical and mental. Thus all trainees, with the exception of those sent by WPA, are certificated through the United States Employment Service.

At the time of enrolling, the trainee is given a mechanical aptitude test which takes about two hours of his time. Later on, he is required to report to the school, at which time some are immediately placed in training and others are given the Otis and Humm-Wadsworth tests, depending on the varying qualifying requirements, these taking approximately two hours ad-

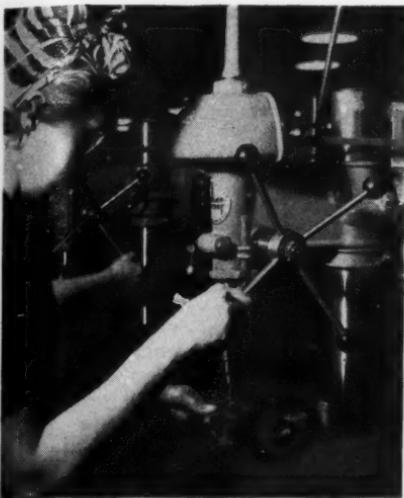
approximately one out of every two applicants has qualified for the training course. Many factors, aside from failure to qualify, have entered into this. For instance, many of the applicants found it impossible to wait until an opportunity was afforded to take the training; others had chances at other jobs.

An effort has been made to balance the output in students trained for various crafts in accordance with the demands for those crafts. The greatest number of requests comes in for students trained to operate milling machines, turret lathes, screw machines, grinding machines, planers, and shapers—all crafts used in the machine tool industry.

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This Trainee is Learning the Use of the Jig for Production Drilling

as practical as possible. The projects are the same as those that will be met in industry. The school, however, provides all materials.

The vocational schools of Cincinnati have designed a number of different types of machine vises and machine tool accessories that will be used in their own training classes, and the production of these parts and tools comprises a part of the training program.

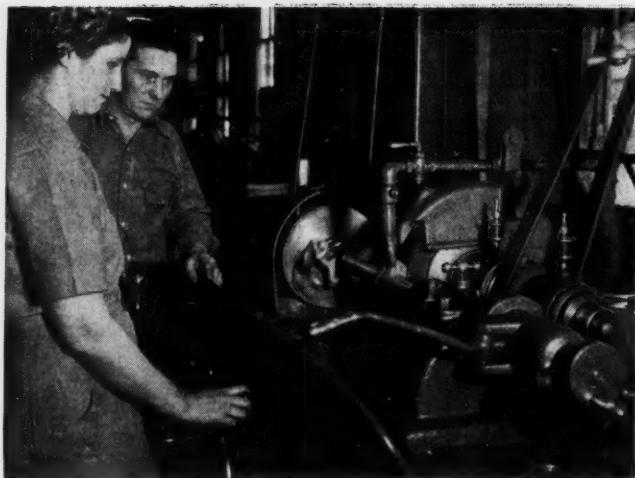
Other projects include the production of pieces that are counterparts of parts that are used in industry, involving operations identical with those employed in actual defense production such as the turning, boring, facing, threading, and other operations performed on machine tools, fitting, benchwork, assembling, and so on. An effort is being made to establish departmental routing which

The training program has been set up to provide as nearly as possible the answers to the types of problems that will be met in industry. The production background is the first consideration. Inasmuch as the students are expected to step right into industry and produce, upon the completion of their training period, the program is one of complete co-operation with the manufacturers.

The manufacturers, on the other hand, provide drawings of various types of work found in actual production so that the training may be



Here an Instructor is Teaching a Trainee How to Set Up a Job on a Modern Production Milling Machine



Some Women Make Excellent Operations on Fine Work. Here is One Learning the Operation of the Cylindrical Grinder

will duplicate that used in actual production.

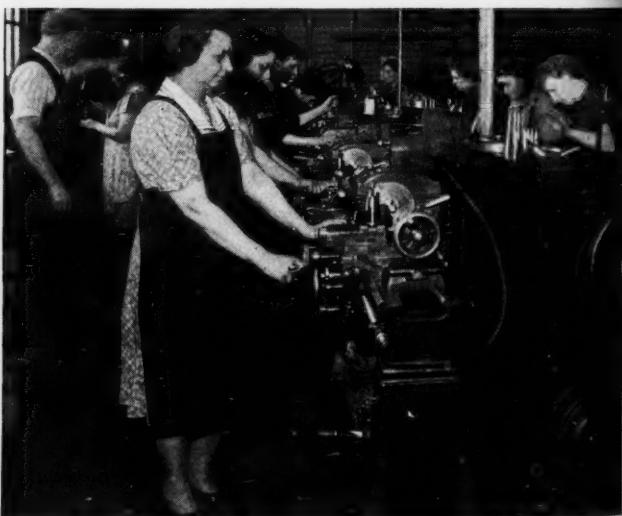
Defense work trainees come from non-defense industries, from businesses and industries that have been forced to curtail operations due to lack of materials, and from various unemployment sources, the WPA supplying many desirable trainees from its ranks.

The training plan now in operation was conceived following the announcement of plans for the construction of the huge Wright airplane engine plant at Cincinnati and was developed to provide workers for machine tool

and other defense plants, as well as for the Wright plant. At intervals machines and tools have been added to the equipment to provide a balance of training in the various crafts required in defense work.

The school management consults at regular intervals with the managing executives in local machine tool and other war production plants to learn what types of skills are most needed.

Previous to the emergency, the Cincinnati Vocational School training programs were exactly what the

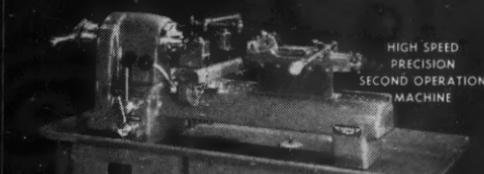


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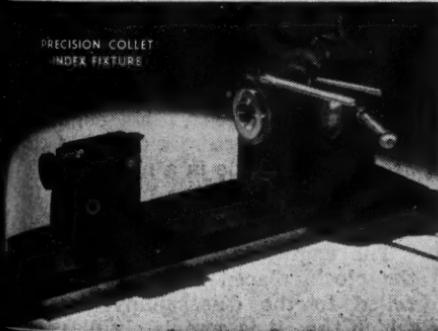


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Fitting and Assembling
Drill Press Vises by the
Progressive Assembly
Method. Each Worker
Performs a Separate
Operation.

name indicates—basic training in a wide variety of crafts. In times of peace that program was excellent, but as the implications of the emergency became more evident the policy of the schools was changed to meet the need of the hour.

Internal Combustion Engine Assembly and Test

The question of training aircraft engine assemblers and testers was one of great concern to the officials of the new Wright Aeronautical Corporation plant. Heretofore, these workers had been trained in the factory by placing the green or inexperienced men alongside of experienced men. No program of training had been set up to do this job by classroom methods.

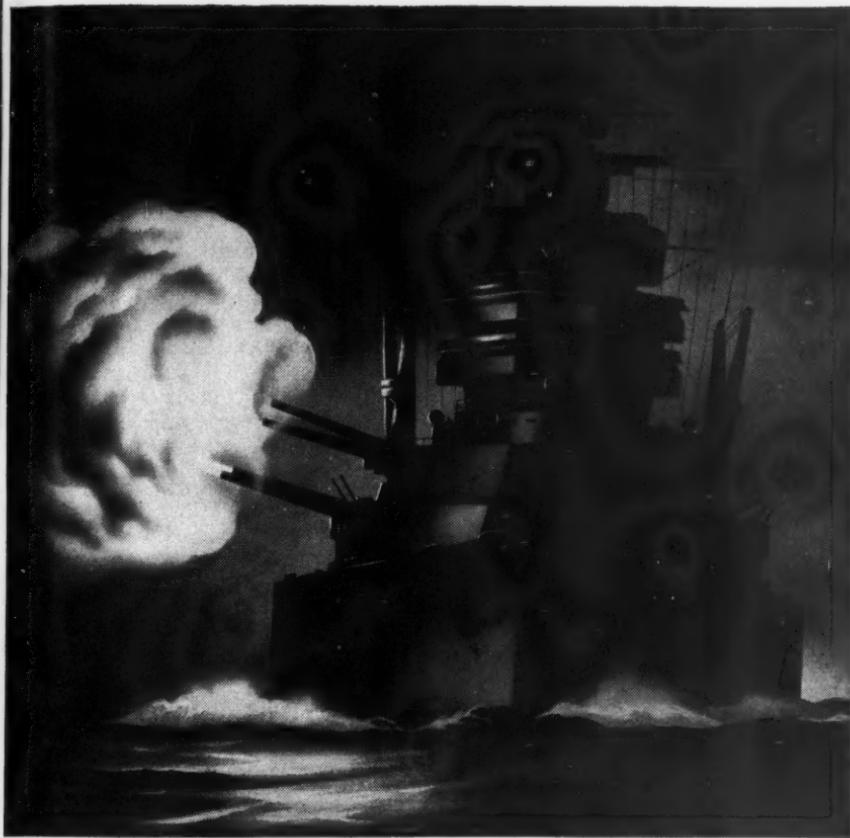
Production engineers from the corporation visited the Cincinnati Automotive High School on several occasions in the fall of 1940, at which time preliminary plans were made for training men to be used as assemblers and testers. The company agreed to supply the Aviation Division at the Automotive High School with two of the engine models which were to be made in the Cincinnati plant. These were fourteen cylinder, 1700 h.p. engines, valued roughly at \$20,000.00 each. It was definitely

established at that time that the school would need to take over the problem of developing the course of study, selecting and training the teachers, and assume full responsibility for the mechanics of the training program.

Testing a 1700 h.p. engine is not a practical consideration for a schoolhouse near the center of a city of 500,000 people; thus it was decided that this phase of training could not be handled by the school. However, an exact duplicate of an engine test cell setup was provided. In this test cell the engine is swung onto the test stand, all connections are made, and all manipulative operations in this connection are learned.

Methods of attaching an elevating hook or device, methods of assembling footings, methods of calibrating instruments, and all the other work incidental to the testing of an engine of this type are included as part of this training. While it is impossible to make actual running tests of these large power plants, the engine is placed on the testing block, and connections are made in a manner which duplicates exactly the procedure followed at the factory.

The engine is then removed from the block, placed in the cradle, and rolled to the disassembly floor, at which time it is completely disassembled and the parts are given a minute inspection. The trainees are



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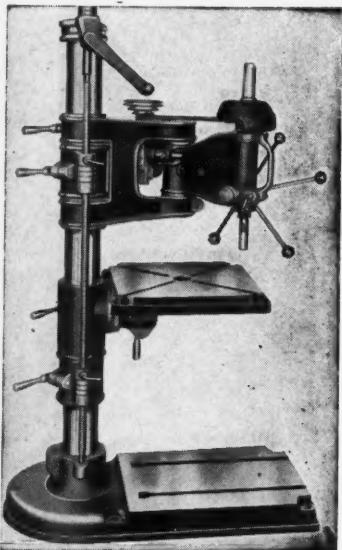
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then instructed as to what to look for, what the condition of the bearings and other parts should be if the workmanship on these parts has been correct, and what flaws to look for if the workmanship has not been first-class. The engines are then re-assembled according to factory procedure.

Although the students do not have the benefit of observing an engine under actual running conditions, the factory records have shown that men trained as testers in this school have been uniformly satisfactory when placed on the job. It is apparent that the thoroughness of the training received in the school offset the disadvantages of not observing the actual operation of the engine.

The Teacher Problem

Great care has been exercised in the selection of instructors. Each instructor must have not only the academic qualifications, but must also have had ample practical experience in machine work, plus the ability to teach. This last qualification is as important as the others; knowing a subject thoroughly and being able to impart that knowledge in a clear and understandable manner are two different things, and comprise two qualifications not always found together.

The school operates on the six-hour shift basis, one-half hour of which is spent in the classroom. In other words, each student spends a half hour each day in the classroom learning the principles of the work he is doing, learning the use of measuring instruments, and so on. He is first taught the use of the scale and caliper, then the micrometer, thread gage, or any other tools or instruments that might be used on the work for which he is training.

Machine Tool Operators
At the beginning of his six weeks'

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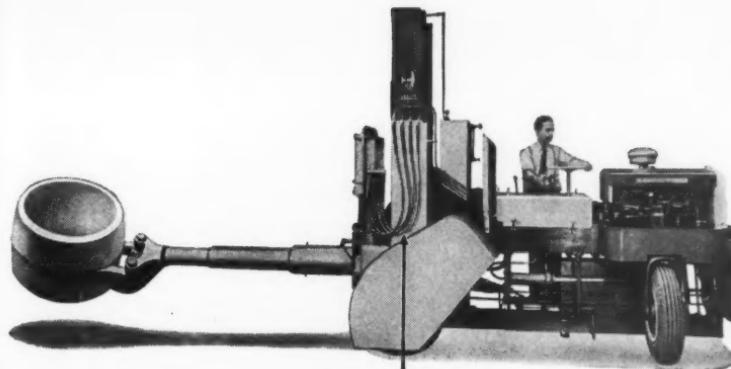
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The "muscles" for this mechanical arm have to be more than strong

AMERICAN Seamless Flexible Metal Tubing, carrying hydraulic fluid to actuate the arm of this huge industrial truck, comes in for a tough assignment.

The truck cruises up to furnaces whose temperature is 1800°F., scoops up a molten mass of glass and transports it to rolling mills. The "muscles" are American Seamless—which conveys fluid at 1800 p.s.i. to lower and raise the heavily laden arm while being subjected to the high temperatures at the furnace mouth.

This rigorous service is typical of the jobs that industry has found for tough, pressure-tight connectors of American Seamless, and is typical also of the jobs Uncle Sam has selected for all the products of American Metal Hose. In fact, our government is currently using the major part of our production and will probably continue to do so until victory is assured.



Better Sight for Better Defense—In the famous Bausch & Lomb plants, essential optical instruments for defense work and for defense workers begin in flaming furnaces like this one. Here, a Howell industrial truck with arm actuated through sturdy American Seamless, quickly and efficiently handles molten glass, later to be converted into research instruments, lenses, etc.

42175A



American Metal Hose

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Subsidiary of Anaconda Copper Mining Co. • In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario



Learning the Operation of the Milling Machine. Here an End Mill is Being Used to Mill Tangs on Drill Sockets

course, each worker is carefully observed to discover special aptitudes, and the selection of a machine for his especial training is based upon his ability to learn quickly, to grasp the principles of fine machine work quickly, and so on. Sometimes, however, an error is made and it becomes necessary to change a worker on a given type of machine or work and place him at an entirely different type of task. Because a trainee doesn't grasp the fundamentals of a certain type of machine quickly doesn't mean that he may not make an entirely satisfactory operator on a different kind of machine.

When a new trainee is placed at the machine upon which he will receive his primary training, he is first instructed in the functions, operation,

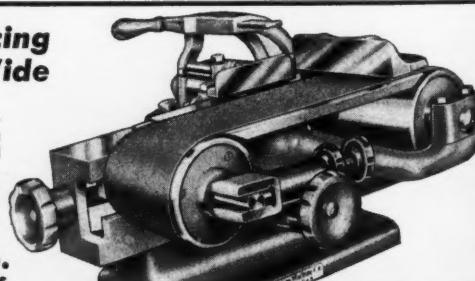
and care of the machine. The necessity for adequate lubrication is impressed upon him, he is shown the locations of the various oil holes and grease cups, and is taught

the use of the oil can. He is then taught to wipe all superfluous oil and grease from the machine and to keep it clean. He is then shown how to start and stop the machine, the instructor placing special emphasis upon the factor of safety.

As soon as the trainee has become thoroughly familiar with the controls of his machine he is instructed in the use of the chuck and the proper way to chuck a workpiece. This followed with instruction in the setting of the tool and the proper way to take a rough cut on the work. He repeats this operation on a number of similar parts. As he becomes familiar with the machine and the use of the cutting tool, he is given finer work to do until he is thoroughly familiar with work of the class for which he is

Eliminate Hand Surfacing on Work up to 6" Wide

This Bench Surfacer cleans and finishes castings, dies, stampings and any work that can be ground. Gives a straight line finish and leaves edges sharp. • Compact, durable, smooth running, with quick, easy adjustments. • Other Belt Surfers and Polishers, Tool and Cutter Grinders, Sensitive Drills.



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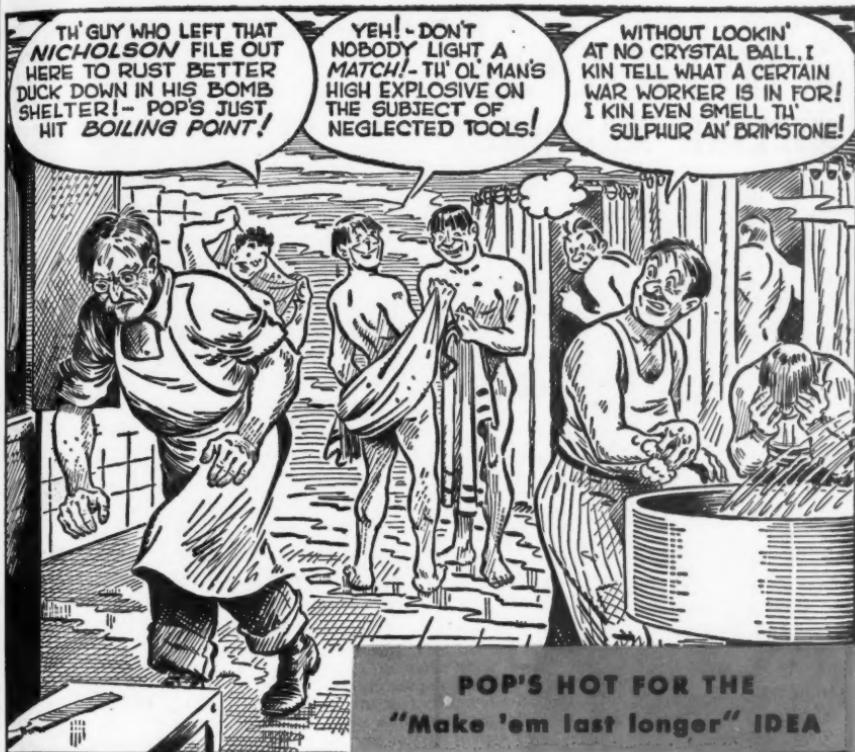
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**POP'S HOT FOR THE
"Make 'em last longer" IDEA**

ABUSE of files wastes fine tool steel. To get the most out of files the efficient worker observes these rules:

- Use *The right file for the job.*
- Don't put too much pressure on filing stroke.
- Don't ever "drag" file back under pressure.
- Don't throw files in drawer or tool box containing other objects.
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- Keep files in a dry place to prevent teeth-corroding rust.
- Keep files clean of "chips"—brush frequently with file brush or card.

The better the file the greater the reward of care. Nicholson and Black Diamond files are made to serve long under normal circumstances, still longer under proper care and use. Nicholson and your mill-supply house guarantee *Twelve perfect files in every dozen.*

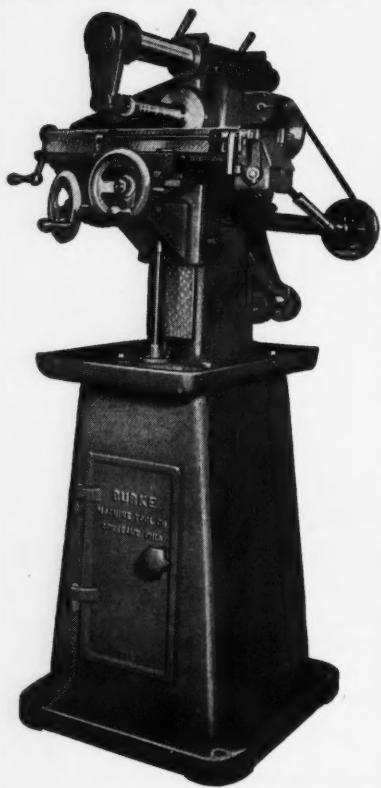
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Write for complete information.

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undergoing training.

There is, of course, a wide variation in the length of time required to turn out a trained operator, due largely to the variation in the backgrounds and previous vocations of the trainees. Some trainees learn to become good operators in as little as two or three weeks; others take the full time of 300 hours, which is the equivalent of 10 weeks. Most of the trainees qualify within that length of time; any who are unable to do so must step aside to make room for others who may be more intelligent or adaptable.

Thus far, the school has had more requests for trained operators than it has been able to fill. One firm alone in the Cincinnati area has absorbed more than 800 of these trainees. Just recently one gear manufacturer made an inspection of one machine shop and after observing the trainees at work selected 26 men for his own production machines.

M. S. A. Defense Bulletin No. G-4
Essential emergency safety equipment for plant protection and safety departments is completely described in an eight-page, fully illustrated Defense Bulletin No. G-5 issued by Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa. The bulletin, covering a complete range of safety equipment for wartime conditions, features on the cover a suggested grouping of essential items at strategic locations in plants. Inside pages include descriptions of gas masks, helmets, gas detectors, inhalators, asbestos suits, goggles, respirators, first aid kits, stretchers, splints, fire blankets, and so on.

In addition, the bulletin introduces three new special items—the M.S.A. Steel Helmet for plant guards and repair squads as well as air-raid service squads, the M.S.A. Defense First Aid Belt which contains a large supply of essential first aid materials, and the M.S.A. Combination Traction Splint for use in supporting fractured arms and legs. Copy of Bulletin No. G-5 free upon request.

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These skilled hands belong to 65-year-old Herman Jagow, whose woodcarving skill has delighted thousands of children riding the horses of the merry-go-rounds. Jagow is now operating a lathe, turning out parts for the defense program.

Merry - Go - Round Builder Makes Parts for Bombers

From Merry-Go-Rounds to Bomber Parts is a Long Step, but Here is a Plant that has Changed Over Without Difficulty

FOR more than twenty years a firm in the Middle West has been building merry-go-rounds and other amusement devices to delight the children and thrill the pleasure-seekers in amusement parks all over the world. Its rides have many times been the outstanding attractions at county fairs. But the constantly-increasing danger from the European situation changed all that. Almost over night this firm stopped production on amusement devices and turned to the production of fighting materials.

One of the first defense jobs taken on was the fabrication of metal

towers which are used by repair crews to reach the noses of giant bombers when the bombers are at rest on the ground. Because of its success with this job and the growing reputation of its craftsmen, the company was called upon by airplane plants to make parts for pursuit ships and bombers. As early as the fall of 1940 it was in armament production.

Without delay the employees were trained in new duties. Men who had spent a quarter of a century carving horses' heads for merry-go-rounds were switched to lathes. Men whose job it had been to paint modernistic



The South Bend Lathe shown here was formerly used to make parts for merry-go-rounds; this illustration shows the lathe in use roughing out an Acme square thread on an extractor rod for a 6-inch naval rifle.



designs on a silver-stream thrill ride went over to die casting. No time was lost bewailing lack of training; every man in the plant took up a new task with enthusiasm.

The change-over to an entirely new line of work necessitated much planning and the schooling of the employees for the work they were to do. From ordinary machine and structural work, the firm found itself engaged in the highest type of precision machine and erecting work.

Among the first jobs on defense

work was an order to make a large quantity of hooks to be used on airplane packing cases which were to be shipped abroad. This was an interesting job, but it required the use of a large press to bend the hooks to shape—and we didn't have the press. However, we did have a horizontal bulldozer which had been used to shape the tracks of various types of "rides" and, in spite of protests that it couldn't be done, we adapted this machine successfully for the job.

After the first couple, sub-con-



While a plant officer looks on, machinist Arthur Greaves sets up a vertical boring mill to machine a sheave ordered as part of a sub-contract on war materials.



The drill press shown here, formerly used to machine parts for merry-go-rounds, is now used to perform face milling operations on landing gear cases for Airacobras. Methew Kipa, expert machinist, is using a depth micrometer to check the accuracy of his work.

large seaplanes, for which the firm was commissioned to design and build a sample. This job involved great secrecy, but enough can be told to indicate that it was a portable device that could be taken down and put up in a hurry, or packed in a self-contained haul-away outfit.

Another job that was taken on contract was the development and construction of many sets of automatic motorized transfer tables; devices used for the handling of dies and stock to and from enormous



John Brown used to weld rails for merry-go-rounds. Now he welds steel shipping frames for airplane motors.



tracts came in rapidly and it became necessary to increase the mechanical staff from 20 to 41 men. Jobs included the making of jigs and fixtures of tank production, gun mounts, tools, punches, dies, and gages for plane production. These jobs kept the machine shop going at full capacity, so attention was directed toward other classes of work for the fabrication, erection, and woodworking departments.

The plane plants required hundreds of assembly stands, shop "dollies," and other devices, all involving work of an accurate nature. The Navy Department Bureau of Aeronautics requires special equipment to service

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- 6 Angularity of Surfaces or Between a Bore and a Surface
- 7 Run-out of a Roller with Respect to an Eccentric Axis
- 8 Parallelism of Surfaces or Edges
- 9 Two Dimensions Simultaneously





Here Herman Jagow, whose hands were pictured in the first illustration, is shown clamping a landing gear housing part into a fixture for a lathe operation.



where they are instead of having to roam the country looking for jobs. Most important he is turning out arms right now, when his country needs them most.

Silver Actually Costs Less Than Many Engineering Metals

Silver often suffers because it is ranked as a "precious" metal. Engineers and designers who hardly stop to think twice in specifying alloys which contain tungsten, molybdenum or beryllium or the use of sintered carbides, all of which cost more per pound than silver, sometimes hesitate to employ silver or silver alloys costing much less, even though they know the merits of silver. Despite this, silver is gaining industrial uses with great rapidity—in millions of silver contacts, for example—and will continue to do so as engineers learn to forget that it is precious and put it to use in everyday jobs for which it is ideally suited.

hydraulic presses. The use of these tables enable each press to do the work for which four such presses would normally be required.

By filling his plant with war work, tackling any job that seems within reason, this manufacturer keeps his plant alive and his organization intact despite shortages of materials for non-essential products like merry-go-rounds. He has made it possible for his employees to work



In times of peace this bulldozer was used to shape tracks for "rides" for amusement parks and fairs; now it is producing equipment for use in airplane factories.

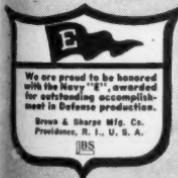
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Extinguishing Magnesium and Incendiary Bomb Fires with Coal-Tar Pitch

By LEON M. LEFFINGWELL

WITH the increased production and use of magnesium metal in aircraft and for other military purposes, the occurrence of magnesium powder explosions and magnesium fires has become more frequent. This contingency has called attention to the need for a satisfactory agent for extinguishing magnesium fires.

In fighting these fires it is as essential to know what not to do as to know what to do. For instance, it is important not to disturb the fire violently by projecting onto it jets of

liquid, by throwing of an extinguishing agent, by drafts of air, or by any other means; such disturbance may spread the fire and may even result in an explosion.

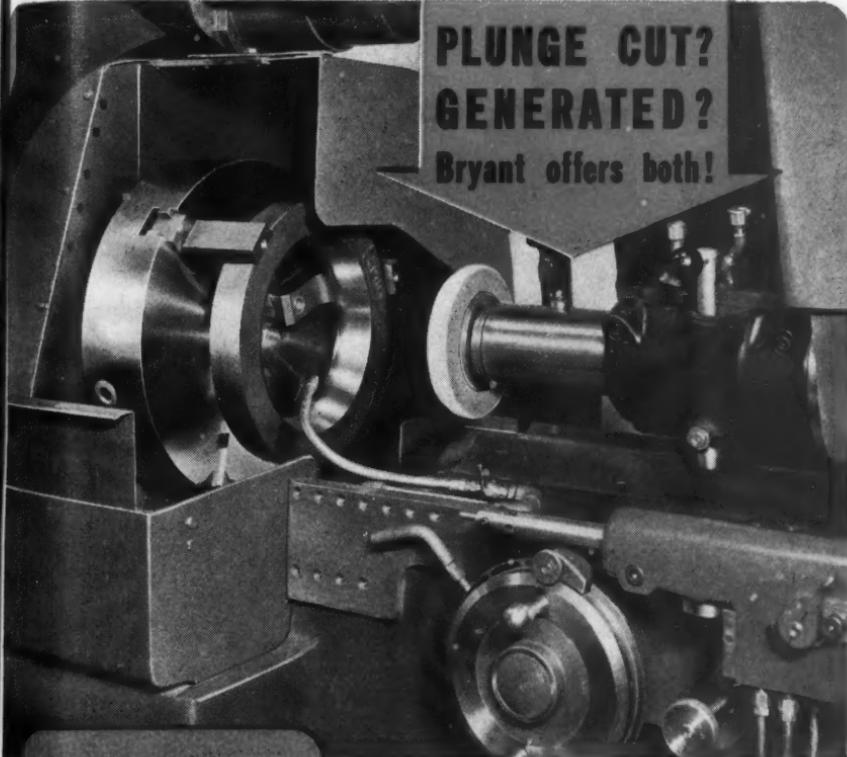
The application of water, carbon tetrachloride, carbon dioxide, foam and other common extinguishing agents on magnesium fires generally speeds up the rate of burning rather than to stop the fire.

Careful application of graphite, sand, clean cast iron chips, talc, or slag by spreading the material on

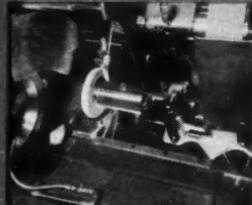
and around the burning magnesium helps to check the spread of flames, but if air reaches the fire through this covering, the magnesium will continue to burn underneath and



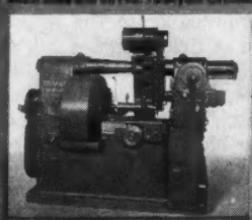
A Magnesium Fire on a Concrete Floor. helmeted Fire-Fighters Scoop the Coal-Tar Pitch from a Bucket, Pour It Slowly About the Fire, then Spread the Pitch Over the Flame with a Long-Handled Implement



PLUNGE CUT?
GENERATED?
Bryant offers both!



View showing formed guide attached to
wheel slide arm on No. 16 Bryant Grinder



No. 16-28" Bryant Internal Grinder

THE Bryant principle of overhead wheel slide suspension lends itself to the easy, profitable grinding of dies and similar parts.

A guide is used for controlling the wheel slide traverse to follow the work contour or for controlling the shape of the wheel if the plunge cut method of grinding is preferred.

The first, or generating, method has been favored by many manufacturers of dies due to assurance of smooth blended curves and freedom from rings left by the abrasives.

The plunge cut method is much the faster method due to the larger area of contact of the grinding wheel.

Which method will best suit your requirements? Our engineers and field men will gladly help in solving your problems.

BRYANT CHUCKING GRINDER CO.
SPRINGFIELD, VERMONT, U. S. A.

Fire Smothered by Pitch Application



the mass will remain hot for a long time. Furthermore, some of the substances mentioned are highly abrasive and cannot be used on or near machinery without causing damage.

A highly satisfactory method for extinguishing magnesium fires of moderate size has recently been developed at the Central Experiment Station of the Bureau of Mines, United States Department of the Interior, at Pittsburgh, Pa. The extinguishing agent used is a very hard coal-tar pitch (approximately 300 deg. F. softening point). Tests indicate that hard water-gas-tar pitch and hard petroleum pitch or asphalt should likewise be suitable. The size of pitch recommended for this use passes a $\frac{1}{2}$ -inch mesh sieve and is coarser than 35 mesh; particles finer than 35 mesh should not be used. When spread over a hot magnesium fire the pitch softens and seals the burning magnesium metal with an

airtight blanket thereby smothering the flame. The pitch is non-abrasive, easily available, and cheap.

To extinguish magnesium fire on a metal or dry concrete surface or on dry ground the procedure is simply to spread (not throw) with a long-handled scoop or shovel a layer of pitch over the burning metal and

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"INTEREST" ON YOUR INVESTMENT...

To be sure your new, high-speed, high-production equipment will repay you for its installation, give your operators the benefit of highest quality cutting tools at the workhead, where production is determined.

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When the magnesium fire is on a wood floor or wet ground, the procedure is as follows: first apply a small amount of pitch over the fire to reduce heat and glare, then spread a layer of pitch approximately one inch thick on the floor alongside the fire and carefully transfer the burning mass onto the pitch layer, using a shovel or hoe. Finally, cover the entire surface of the fire with more pitch and also scrape away any burning particles or embers from the floor at the initial location of the fire.

If, by the time the fire is discovered, the wood floor is badly scorched or burning, then—after the steps outlined above have been taken—apply a fine stream of water to the burning wood to prevent the spread of the fire. A strong stream should not be used, because it will tend to cause explosions. Insofar as possible, where magnesium is being processed or handled in shops with wood floors,

care should be taken to keep metal pans under the machine beds so that magnesium chips or powder will accumulate in the pans and not on the floor.

Upon extinguishing a magnesium fire on a machine, however, the cooling mass may adhere to the surface of the machine or metal pan. At a certain stage the mass will reach a consistency such that it can readily be pulled off, or if it is tapped with a hammer, it will fall away. If it is allowed to harden, it will become fragile and can easily be broken. Kerosene or benzol will aid the removal of the mass, though one may have to use a tool to get the residue out of the corners.

Pitch can most effectively be used for incendiary bomb protection in industrial plants and in large buildings where trained personnel or watchers are employed and where supplies of pitch in lots of 25 pounds or more

NOW YOU CAN GET CHALLENGE SEMI-STEEL BENCH PLATES

TWO
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... PRECISION GROUND!

These small semi-steel bench plates, precision ground to an accuracy of .0005-inch, are now available for many types of work, particularly inspection and assembly of small parts. They provide an accurate surface and are built for lasting strength and rigidity.

All four sides are machined at exact right angles to the top. Challenge Precision Ground Bench Plates are made in nine standard sizes, from 8x10 to 18x18 inches. Other sizes to order. Prompt delivery on standard sizes. Ask for prices and data. 411



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IT IS THIS CONCENTRATION of study and specialized efforts which has resulted in the present day Ross leadership.

TODAY ROSS AIR CONTROL VALVES are playing a most important part in speeding up production of rifles, machine guns, anti-aircraft guns, bombs, cartridges, shells, tanks, trucks, tires, airplanes and in controlling various devices on board fighting ships and airplane carriers.

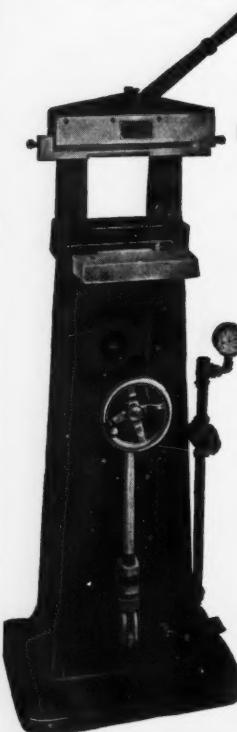
REGARDLESS OF YOUR LOCATION, there is a Ross representative close by who is eager to help you keep your air actuated equipment operating at top efficiency . . . with one purpose uppermost in mind . . . shortening as much as possible this war and the road to a glorious VICTORY!

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This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked showing lettering and location, also state required production.

GEO. T. SCHMIDT, Inc.
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CHICAGO, ILLINOIS

can be maintained at strategic locations. For incendiary bomb protection in small dwellings, defense organizations recommend the use of dry sand and water sprays.

Pitch of the type recommended and in the size specified is available from the following firms:

Reilly Tar and Chemical Corporation, Merchants Bank Bldg., Indianapolis, Ind.

Black Products Company, 135th St. and Calumet Ave., Chicago, Ill.

Geo. F. Pettinos, Inc., 1206 Locust St., Philadelphia, Pa.

The O. Hommel Company, 211 Fourth Ave., Pittsburgh, Pa.

Oakite News Service Vol. XXVI, Nos. 3-4. A four-page article on the production cleaning of small arms ammunition is one of the features of the March-April issue of Oakite News Service, industrial cleaning magazine published by Oakite Products, Inc., 57 Thames St., New York, New York. Complete with flow sheets and diagrams, the article states that the large number of relatively small parts which must be handled makes it important that the cleaning equipment used assures a smooth flow of work with minimum handling. A drum-type washer, providing a tumble-wash followed by a spray-wash and using an alkaline material, is described in detail. Requirements which must be met by the cleaning material selected are given. Additional factors such as correct timing during washing operations and the choice of an easy-to-remove, uniformly mixed compound in previous drawing operations are also treated.

Also of interest is an article describing the Bullard-Dunn Process as applied to wartime production. After a discussion of the nature of the process, certain facts concerning alkaline pre-cleaning and its importance in obtaining maximum efficiency are given. Also included is a listing of the many applications of the process. Copy of Oakite News Service Vol. XXVI, Nos. 3-4 free upon request.

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Portable Electric Tools are made of Critical Materials

DO NOT Use Them Carelessly



A glance at the ingredients of a portable electric tool shows why you should use the tools you have carefully.

Stanley Portable Electric Tools are in tremendous demand. Unless you are engaged in war production work, you may find it difficult to replace the ones you have. If some part wears out, don't throw away the tool - have it repaired or rebuilt.

We shall do everything possible to continue to furnish repair service and replacement parts for all Stanley Electric Tools. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.

STANLEY Electric Tools

Salvage For Victory In the Grinding Room

By HENRY R. POWER

The Carborundum Company, Niagara Falls, New York

THE "duration" demands for practically every item of modern commerce from Aluminum to Zinc in the metal column; from Bauxite through Chromite to Wolframite, in the ore column; from Electrically Fused Aluminum Oxide through Corundum and Silicon Carbide to Tungsten Carbide and Tantalum Carbide in the column of abrasives and hard tool materials, requires that every shop give heed to the request of Mr. Donald Nelson to conserve and salvage its everyday working materials.

The first step in salvage is, of course, most efficient use of the materials in question. For instance, this war has brought into extensive use a tool unknown in World War I made from Cemented Tungsten Carbide, Cemented Tantalum Carbide, Cemented Molybdenum Carbide or mixtures of these known under various trade names as Carboloy, Firthite, Vascoloy - Ramet, Widia, etc. While the amount of this cemented carbide in any one tool tip is very small on a poundage basis, it represents considerable metallurgical effort in its manufacture and requires considerable care to prevent chipping, checking and cracking of the tip.

Special grinding wheels have been designed for use on this type of tool only, and special instructions for grinding have been issued by the grinding wheel makers. These direc-

tions cover the choice of wheel, the size of wheel, the proper coolants, the condition of the grinding machine with respect to rigidity, looseness of spindle and skill of the operator. Since speed has become such an important factor in the war effort, the use of diamond grinding wheels for reconditioning cemented carbide tools has been accepted as imperative and indispensable.

If the precautions of the grinding wheel makers, based on research over the peaceful years between the wars, are carefully observed, the most economical use can be made of this comparatively expensive tool.

Nearly every grinding shop uses diamonds for the dressing and truing of grinding wheels. This is an operation on the grinding wheel to create concentricity or parallelism, or to alter the wheel shape, or to change the cutting action of the wheel face after the individual abrasive grain crystals have become dulled in use.

In normal times, diamonds for these purposes are comparatively expensive, and since this important "mineral" is mined in far away Africa, the obvious economical use of the diamond tool merits the attention of the grinding shop foreman. There is no substitute tool for the diamond tool. The only substitute is care in use, in place of indifferent sloppy practice. Proper use is defined in instructions issued by both the dia-

In

METAL
CUTTING
METHODS

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NEW BOOK

Tells How to Get

**MORE
PRODUCTION**

from your

METAL-CUTTING SAWS



Under today's wartime conditions, Simonds' leadership in the manufacture of Metal-Cutting Saws involves a special duty to help all saw-users get the utmost in production on metal-cutting jobs.

Year after year, knowledge accumulates . . . resulting in better methods that increase production. This knowledge is now available in the compact Simonds handbook, "Metal-Cutting Methods", to help you choose the most efficient operating procedure. *This new book is free to users of metal-cutting saws.* Write for your copy now, to:

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mond tool makers and the grinding wheel manufacturers who have collaborated over many years for the solution of this problem.

Another pre-salvage or conservation problem is that concerned with the grinding wheel itself. The proper speed of wheel, size of wheel, the choice of grit, grade, bond and structure to give maximum efficiency, the care of the grinding machine, attention to spindles and bearings, all have a relation to the maximum production with minimum wear of the wheel. Wheel dressers made of circular discs are now available in a variety of designs to avoid hogging off too much of the grinding wheel body, with the incidental waste of abrasive.

When metal is ground with an abrasive grinding wheel, the grindings are a mixture of abrasive and the ground metal. The abrasive has little salvage value, but the metal which is the larger fraction of the mixture may be worth salvaging. This metal may be cast iron, or one of the more strategic steels like chromium-nickel alloys. If the amount is in sufficient quantity and it can be kept segregated in the grinding room, separation can often be obtained by use of electromagnetic machines. The abrasive, either Silicon Carbide or Aluminum Oxide, is non-magnetic and passes through the magnetic machine while the iron or steel portion is picked up by the belt under the poles of the machine and discharged in containers provided for the purpose. Electromagnetic machines are available in the market.

Chemical methods are unsuited to separate magnetic metals from abrasives because the abrasives are either insoluble or they dissolve only in chemicals that dissolve the metal as well.

Grinding wheels can often be used on different jobs of grinding; after

using them on one job requiring a large wheel, the worn, smaller wheel may be suitable on another job. This salvage operation has been in use by some concerns for many years.

New Buick Engine Plant

(Continued from page 118)

air-blast onto the surface of the cylinder head, forming a coating that completely seals the surface of the head from the air.

By the time a head has passed all of the eight guns it should be completely coated, but to make sure that no spot has been missed, or that the coating is too thin on any part, the operator also uses a hand metallizing gun to "touch up" such spots. In consequence, each head is thoroughly coated before it leaves the machine.

(The second section of this article will be published in the next issue of this magazine.)

"Horizontal Pumps" is the title of an eight-page illustrated bulletin released by The Watson-Stillman Co., Roselle, N. J., describing high pressure motor-driven and steam pumps. Under "Medium Duty Pumps," two and four-plunger yoke type and four-plunger connecting rod type pumps are covered. Complete information is given on 47 different ratings, which include pressures from 380 to 12,000 lb. per square inch and displacements from 0.5 to 39 gallons per minute.

Under "Heavy Duty Four-Plunger Duplex Pumps," 40, 60, 100, and 200 h.p. types are treated, with complete ratings given on these pumps as well as on a 150 h.p. type. The 45 ratings of all five types range from 650 to 10,750 lb. per square inch and 7 to 186 gallons per minute.

Thirty-six steam pump ratings are given ranging from 900 to 13,200 lb. per square inch and 1.25 to 45 g.p.m. displacement. Copy of Bulletin 270-A free upon request.

SHOR~~TAGE~~ PROBLEMS BY

TOGETHER LIKE THIS

Is your production suffering because of a labor shortage? In many plants this problem simply must be overcome in order that the upward swing in production can be continued.



Like other problems facing American industry this one will be licked. Here is one way to do it --

Enlist the aid of the thousands of American women who are eager to serve their country as production soldiers. Put them to work in your plant--together they will form a battalion that will release great numbers of skilled male workers for other more strenuous jobs. As for their ability to operate machines, well, here is the actual experience of a well-known manufacturer of chucks.

He is grinding chuck jaws on Landis 4" Type H Plain Hydraulic Grinders operated by comparatively inexperienced female employees. He reports as follows: "Since the installation of these

Landis machines, production has increased 35%, a power saving of 30% has been effected and wheel life has been greatly extended. Maintenance records have been very low."

Perhaps, if you have a labor shortage problem, it can be solved in a similar manner. But remember--for best results choose grinding machines that are easy to set up and operate, and that can be used continuously without the need for time-consuming readjustment and repair. Or, more specifically, for best results choose Landis Grinders.

*Unusual Performance
As Usual*



LANDIS TOOL CO.

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MICROSPHERE
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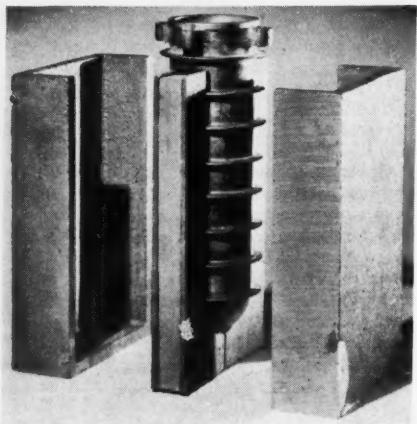
VARIABLE
VOLTAGE
HEADSTOCK

385

Modern Equipment at Work

Quick and Economical Method of Making Special Chuck Jaws

A COMPARATIVELY new method of reducing the cost of making chuck jaws for holding irregular shaped pieces, through the use of a low-temperature-melting bismuth alloy, is becoming popular in many

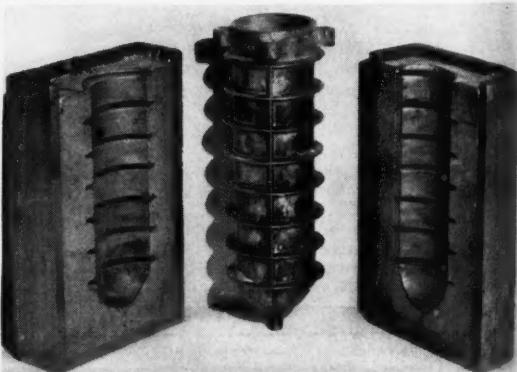


(Above)—The Workpiece is Set into a Wooden Spacer, Which is Clamped Between Brass Retaining Shells. The "Cerromatrix" Matrix Metal is then Poured, Forming Two Halves of a Chuck. (Right)—The Completed Chuck Jaws of Matrix Metal Ready for Use

metal-working shops. Because of its low melting temperature, this metal—known as Cerromatrix—can be cast against forged metal parts, die

castings, rubber, wood and most molded plastics without the danger of burning or warping the piece. Its hardness and the fact that it expands slightly on solidifying add to the advantages of the alloy for this purpose.

Experience has demonstrated that these chucks will stand up for long production runs, having in many cases been used over 50,000 times without appreciable wear. The chuck jaws shown in the photograph were made by casting the alloy into a steel or brass retaining shell. Note in Figure 1 how the die casting is held in position by a wooden spacer, made in halves, each half being made by nailing two wooden strips to a thicker center piece, leaving a shallow groove the length of the spacer. This groove is filled with a babbittin clay and the spacer pressed against the die casting to make the impression in the clay. The die casting spacers and retaining shells are then lined up as shown in Figure 1 and the shells are brought against the spacers and clamped in position. Suf-



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Boice-Crane DRILL PRESSES

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Make inexperienced and female help, real producers in a hurry. Hundreds of plants working on the U. S. armament program are accomplishing that with these compact, stripped-for-action Boice-Crane Drill Presses. They are more easily adaptable to special needs and far more flexible in tooling up production. Big production increases are reported on practically every installation. They cost less too, and you can get them **RIGHT NOW!** *Send for CATALOG and the facts!*

DRILL PRESSES • TAPPERS • BAND SAWS • WOODWORKING MACHINES
Write BOICE-CRANE CO., Div. A., TOLEDO, OHIO

ficient alloy is melted to fill the holder, taking care to stir well during the melting. The pouring temperature is between 300 and 350 degrees Fahrenheit.

After the alloy has solidified, the clamps are removed and the completed chuck jaws are found shown in Figure 2. The wide spacers between the two halves of the brass holder during pouring have prevented the cavities in the jaws from being any deeper than necessary to hold the piece firmly during machining. The spacers should be thick enough to keep the movement necessary for opening and closing the jaws to a minimum.

The process is just as simple as explained here. In many instances chuck jaws costing as much as \$160 and requiring a week or more to make by conventional methods can be made in the manner described above for as little as \$10, and in less

than two hours. Cerromatrix is a product of Cerro de Pasco Copper Corporation, New York.

Westinghouse Saves 60 Tons of Aluminum Monthly from Scraps

EOUGH aluminum to build 10 army bombers is reclaimed every 30 days from machine shop chips and shavings, according to W. J. Laird, head of the Westinghouse Reclamation division at the Linhart works.

Of the 1,180,000 pounds of non-ferrous metals reclaimed last month, aluminum accounted for 120,000 pounds. This economy program conserved materials needed in the national defense program, saves Westinghouse money and helps maintain increased production. The reclaimed metals include aluminum, copper,

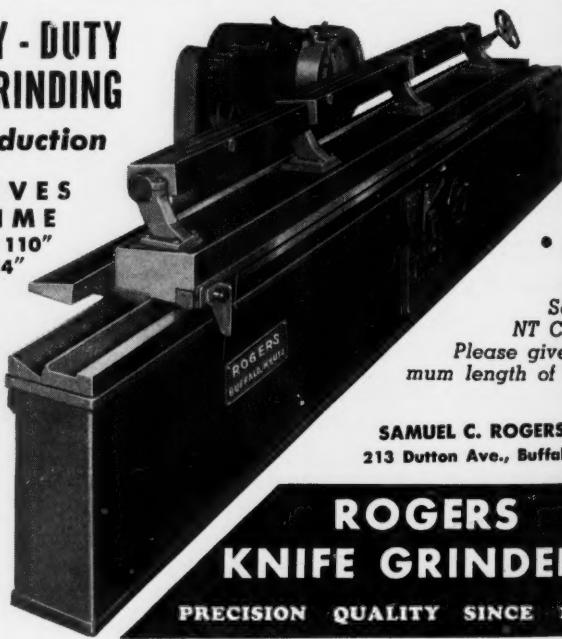
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PERFECT CAP SCREWS
FROM THESE
RED CUT SUPERIOR
Thread Rolling Dies

$\frac{5}{16}$ " x 18 thread

Unretouched photographs
of RED CUT SUPERIOR
"L" Temper dies used by
Rockford Screw Products
Company, Rockford, Ill.

A "not uncommon run" with this remarkable steel!
Says the customer



"TOPS IN TOOL STEELS"

Vanadium-Alloys
STEEL CO. LATROBE, PA.



Iron Separator. Iron is removed from reclaimed metals at the Westinghouse Linthorpe works, east of Pittsburgh, by a magnetic separator that "holds ferrous materials on conveyor belt and deposits the rest in a box. Approximately 20 tons of non-ferrous ingot are produced daily from shavings, punchings and other machine shop remnants that come from Westinghouse plants in the Pittsburgh area, South Philadelphia and Sharon, Pa., and Newark and Jersey City, N. J.

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aluminum base alloys, and copper base alloys recovered from machine shop remnants shipped from Westinghouse plants in the Pittsburgh area, South Philadelphia and Sharon, Pa., and Newark and Jersey City, New Jersey.

After pure aluminum and copper are removed from the metallic mixture, the remainder is divided into

about 50 alloy categories. Placed in a revolving bucket, a batch is thoroughly mixed and tested to determine

exactly what metals it contains and how much of each is present. To get the right percentage of the metals that form a specific alloy, various amounts of pure metals are added and mixed with the reclaimed metals.

Gas furnaces resembling huge teakettles are the melting pots that blend the metals together. Up to 20,000 pounds at a time can be

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Easy to pick up, hard to break down!

MASONITE DIE STOCK—now widely used by the aircraft industry in the fabrication of fixtures for assembling formed metal parts—saves precious time, energy and money.

There is less need for crane or special equipment in transporting or installing fixtures made from this amazing, semi-plastic material. It's only one-sixth the weight of steel yet durable and strong enough for all production assembly requirements.

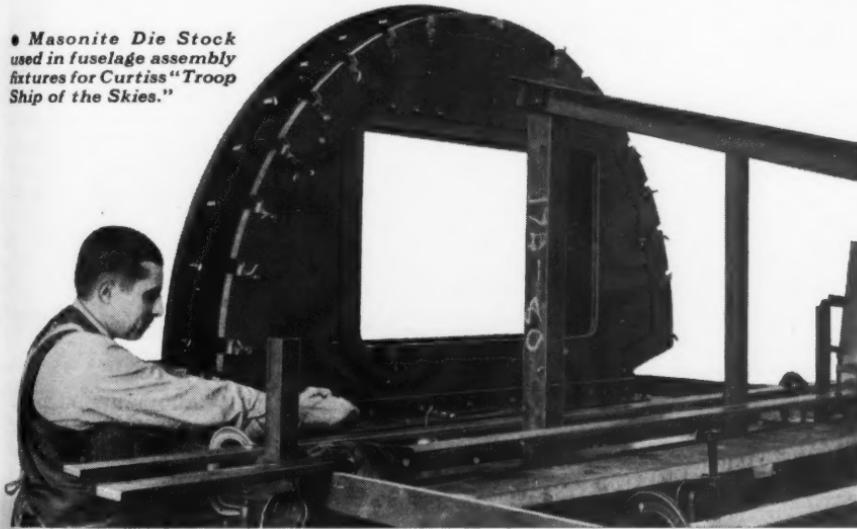
Masonite Die Stock makes possible

low-cost fabrication. It can be drilled and tapped for threads for attaching clamps and gauges. Also press fit drill bushings can be inserted.

While its most spectacular success is being demonstrated in the aircraft industry, Masonite Die Stock is also being used by other manufacturers to do a faster, better job at less cost and effort.

Masonite Die Stock is available in thicknesses of $\frac{1}{4}$ to 2 inches . . . in sizes of 48 x 72 inches and 48 x 144 inches. For further details, fill out and mail coupon.

• Masonite Die Stock
used in fuselage assembly
fixtures for Curtiss "Troop
Ship of the Skies."



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Dept. MM-6, 111 West Washington Street, Chicago, Ill.

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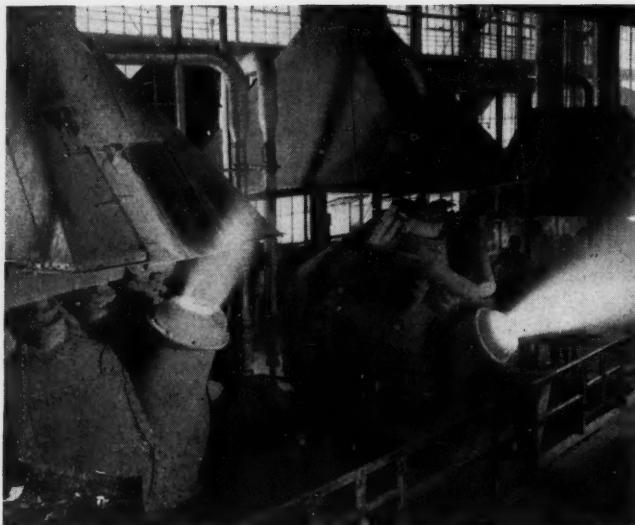
Name and firm _____

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City _____

State _____





"Tea Kettle" Furnaces. Metals reclaimed from Westinghouse machine shop shavings, punchings and other leftovers are melted in these gas furnaces at the Linhart works, east of Pittsburgh, to produce 20 tons of ingot daily. Before the "metal hash" is cooked at temperatures of from 1800 to 2300 degrees Fahrenheit, the mixture is tested chemically, and certain amounts of pure metals are added to create various alloys.

crammed into each furnace, fired at regulated temperatures ranging between 1800 and 2300 degrees Fahrenheit, and poured into molds to form 100-pound ingots. Tested again by chemical analysis to establish the metal content of the alloy, the ingots are assigned identification numbers. The metal then is ready for use at the Linhart works in making various types of castings, or to be shipped to Westinghouse plants for other production uses.

A few years ago Westinghouse paid to have waste paper carted

away. Now manila paper is separated from the mixture and sold back to the supplier. Old blueprint paper and corrugated cardboard are also reclaimed. Last year the Westinghouse Company sold 3,000,000 pounds of salvaged paper.

Silver Brazing Speeds Conduit Box Output

SILVER brazing alloys are helping materially to speed up our war production in a big majority of metal

ACROMARK means "ACCURATE MARKING"

and the ACROMARKER is only one of the FAST but simple machines our engineers build for marking.

This machine is provided in several sizes and special fixtures are made for special work.

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THE ACROMARK CORPORATION

9 MORRELL ST., ELIZABETH, N. J.





VARD'S IMPROVED SNAP GAGE

is Faster, Longer Wearing, and No More Expensive than a Ring Gage

Try the improved VARD Thread Roll Snap Gage. You'll appreciate its advantages over ring gages. You'll find that it does a production inspection job faster, that it outwears several ring gages, and costs about the same as ring gages of a corresponding size. In fact, in the larger sizes, it is less expensive.

The improved VARD Thread Roll Snap Gage is a *visual checking gage*. It not only checks the pitch and the thread form angle of the work being inspected, it also checks the lead. And it can be used flush against a working shoulder.

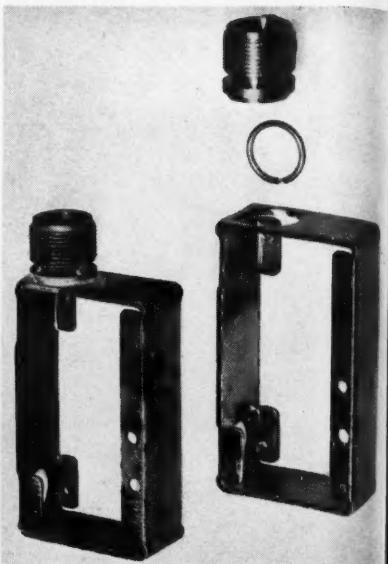
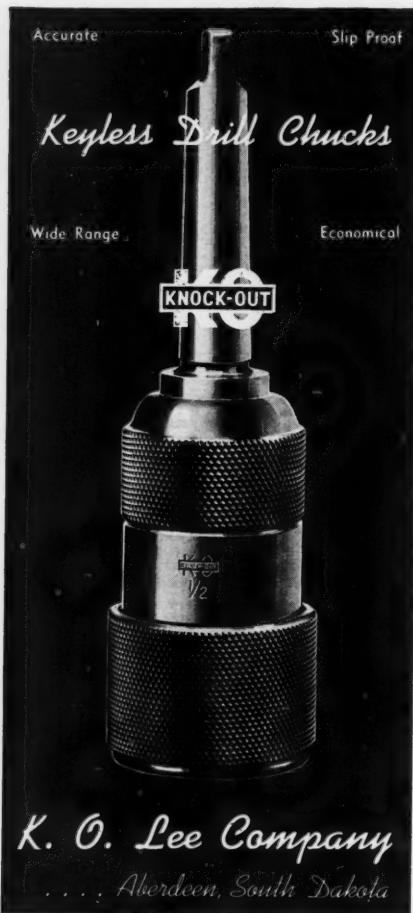
Precision rolls, ground from tool steel, are fitted with eccentric pins so that the gage may be properly adjusted for correct size. These pins compensate for wear and allow variable tolerances.

The new models have a strengthened frame and convenient machine pads for bench set-ups. They are available to holders of high preference ratings in a full range of sizes from 0 to several inches, and in all pitches, including metric.

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working plants. One instance is the Micro Switch housing shown in the photograph. The steel stud fitted into the steel box was formerly brazed with a high melting point base metal alloy; then, after grinding off excess alloy and cleaning, the assembly was cadmium plated.

Recently the base metal brazing alloy was discontinued in favor of a low temperature silver brazing alloy. Production immediately increased to three times the former rate; from



Right — Easy-Flo ring ready for placing between stud and box. Left — After heating to 1175 Deg. F., the ring melted and penetrated through parts. Fast heating, low brazing temperature and elimination of grinding increased production 300 per cent over the former method.

500 per day to 1500 per day. This not only meant faster deliveries to vital war industries, but also permitted an actual reduction in the price of the switch.

The brazing procedure is simple and no radical design change was necessary. After the parts are cleaned and fluxed, a ring of brazing alloy is placed between the stud and the box. The assembly is then heated in a gas fired furnace. At 1175 deg. F. the silver alloy ring melts and flows between the parts, forming a leak-tight joint stronger than any joint made by previous methods.

The manufacturer discovered two other advantages. By using low temperature silver alloy brazing, no grinding is necessary after brazing and the joints remain leak-tight, even when replating is necessary.

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Centerless grinding is performing hundreds of operations in a fraction of the time previously required. And Carborundum has led in developing centerless grinding wheels, which are speeding the output of valves, pistons, shafts, and other products necessary to win the war.

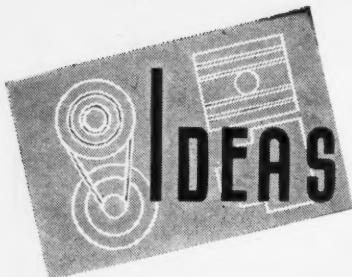


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Simple Design for Clinching and Curling Die

By W. M. HALLIDAY

THE accompanying illustrations present the design of a die that is used to facilitate the assembly of a plate piece to the end of a tubular part. The feature of the design consists in the security that is obtained through curling the end of the tube over the plate and then clinching the

performed at a comparatively high rate of speed and a thoroughly satisfactory assembly is obtained.

A drawing of the assembly is shown in Fig. 1. The flat piece, or plate, is of sheet aluminum, and the tube is of mild steel. The plate is, of course, blanked and the holes are punched simultaneously in a previous operation. The center hole in the plate is punched slightly larger than the outside diameter of the tube so as to permit the end of the tube to be formed to a suitable radius; otherwise the radius-forming member of the assembling die would tend to crush the curled-over portion of the tube against the sharp edge left on the hole in the plate.

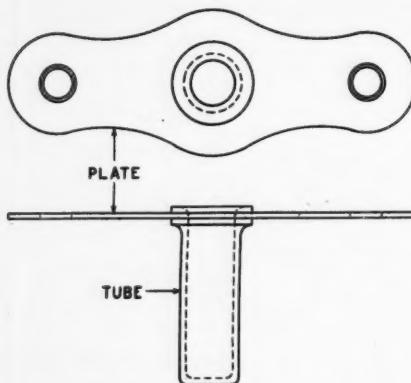


Fig. 1—Drawing of Table and Plate Assembly

end of the tube so as to obtain a firm, rigid assembly.

One of the chief advantages of this type of die is that the complete assembly is effected with each down-stroke of the press ram; thus the curling and clinching operations are

The drawing Fig. 2 shows a cross section of the assembling die at the moment of the beginning of a downward stroke of the punch. A is the bed plate of the machine. B is a cylindrical piece the ends of which are faced square with each other. This piece is bored to provide a drive fit for the cylindrical piece C, and the bottom surface of the part B is counterbored for a short distance, as shown, to take a corresponding shoulder on the bottom end of piece C. The shoulder is to prevent the piece C from being drawn out of the circular block B.

The upper part of the piece C is turned to a diameter which will take the coil spring D, as shown, and is also bored to a diameter slightly

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larger than that of the outside diameter of the tube. A hole is drilled and reamed through the axis of the

until it is forced downward by the pressure of the descending ram and punch **G**.

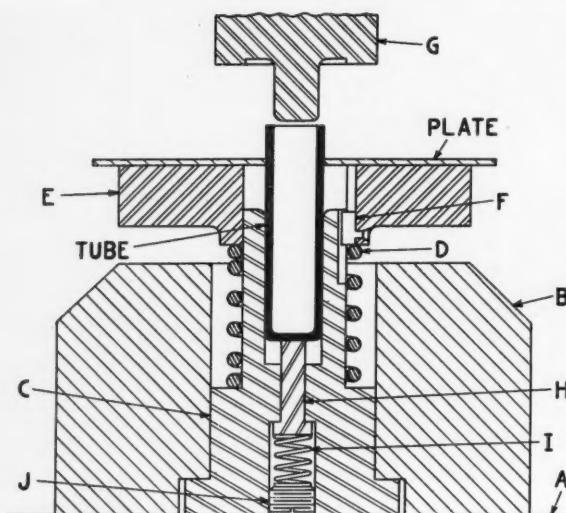


Fig. 2—Drawing Illustrating Design of Simple Die for Clinching and Curling

piece **C** to take the small plunger **H**, and the piece is also counterbored to take the light coil spring **I** which is interposed between the bottom end of the plunger and the plug **J**. The purpose of the plunger will become evident later.

The pressure plate, **E**, is bored to a sliding fit over the top end of the center piece **C**, and is prevented from rotating by the use of a small T-shaped key **F** which is anchored to the pressure plate by means of a screw. A keyway pin piece **C** is made to a sliding fit for the key **F**. The coil spring **D** serves to hold the pressure plate at its highest position

as pressure is applied to the end for the forming operation. As the ram

In operation, a tube component is dropped into the hole provided in the end of the member **C**, the tube coming to rest on the top end of the plunger **H**. The spring **I** is strong enough to easily carry the weights of the tube and plunger; thus the tube is supported so that the upper end projects slightly above the surface of the plate after the plate has been placed in position.

With the plate in position, as shown, the ram descends and the plug on the punch **G** passes into the bore of the tube to prevent the tube from collapsing

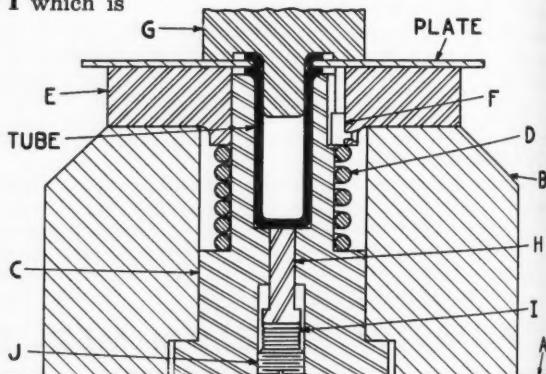


Fig. 3—Die at Completion of Curling and Clinching Operation

continues to descend, the moving punch curls over the projecting end of the tube. Up to this point no



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movement has been imparted to the disc **E**, the spring **D** being strong enough to resist such thrust. Beyond this point, however, the continued descent of the punch carries the disc **E** downward to the completion of the forming operation, which can be seen in Fig. 3.

At this point it will be seen that the bottom surface of the disc **E** is bearing against the top surface of the body **B**, spring **D** being compressed to the maximum and the plunger **H** forced downward until the end of the tube bears against the shoulder at the bottom of the hole. The drawings Fig. 4, 5, and 6 illustrate the curling and clinching action

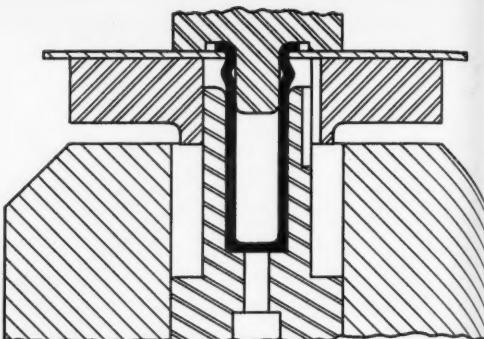


Fig. 5—As Punch Continues to Descend, the Tube Bulges Outward

which occurs at three different stages in the descent of the punch.

Figure 4 shows the first stage of the operation, just after the end of the tube has been flared by the radius at the junction of the plug with the punch. At this point the blind end of the tube is bearing against the bottom of the hole.

Figure 5 shows the operation at the point where the punch has continued downward until the tube begins to bulge outward. Figure 6 shows the end of the stroke, with the tube wall completely folded under the plate. The last $1/64$ -inch of punch movement downward clinches the tube and plate.

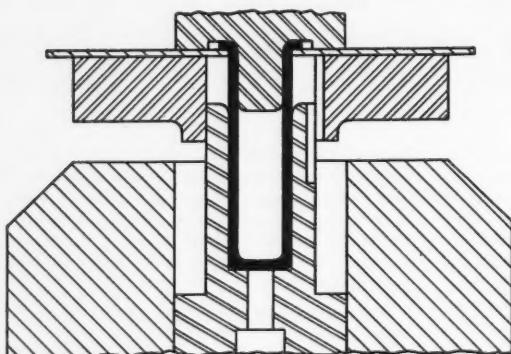
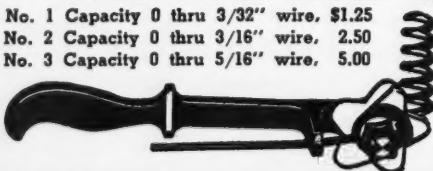


Fig. 4—Die Just after Completion of Flaring Operation

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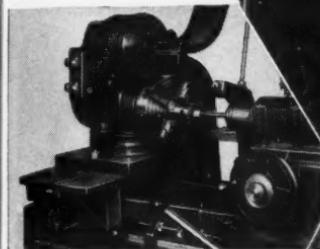


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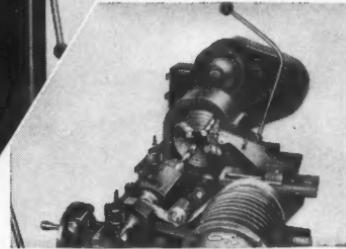
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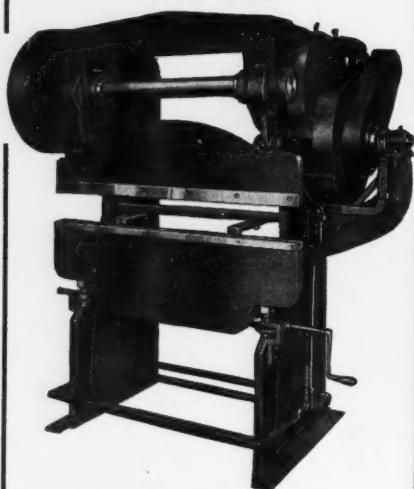
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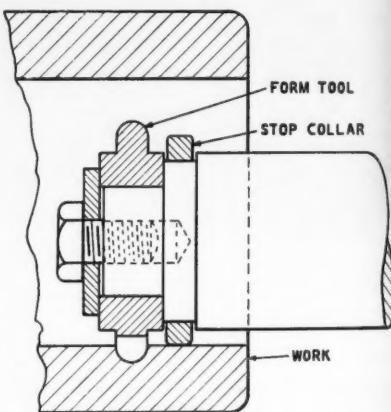
ILLINOIS

The die presented here has operated satisfactorily, producing a satisfactory product at a good rate of speed. The design can be varied to suit a variety of similar applications.

A Boring Tool "Kink"

By H. W. EDMUND

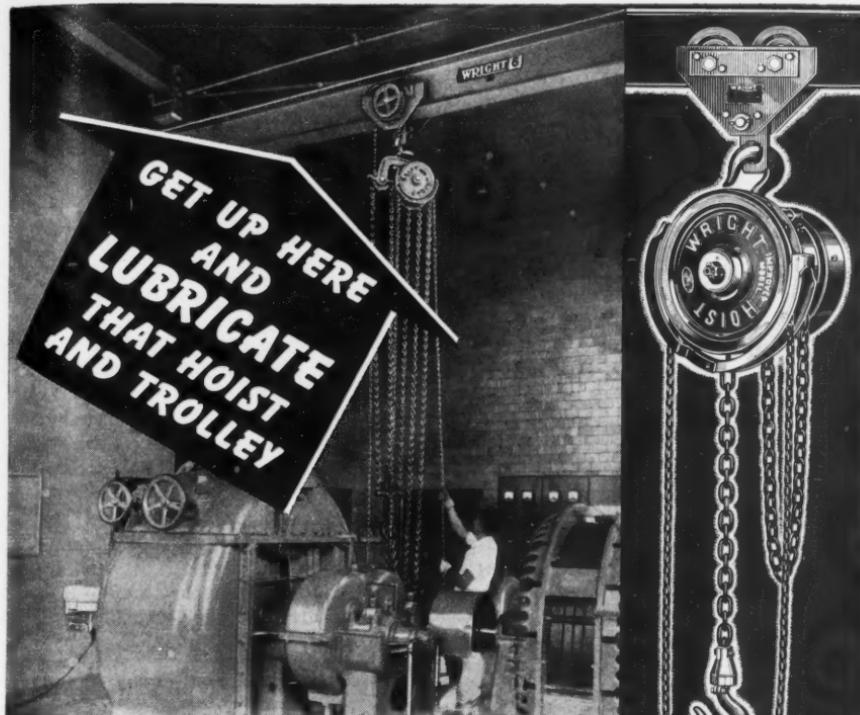
WHEN a drawing calls for recessing in a deep hole that has been bored in the lathe, the machinist must, as a rule, take care that he does not cut the recess too deep. Thus any device that will facilitate recessing to the correct depth with-



Drawing Showing Design of Circular Form Tool for Recessing, with Rotating Stop Collar

out too much trouble is well worth consideration.

The drawing Fig. 1 shows the design and use of a circular-type form tool that will simplify the recessing task. The shank of the tool is a round bar of diameter almost as great as that of the circular tool that is to be used to do the recessing. The bar is turned on the end to fit the hole in the form tool, and drilled and



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If your hoist is under constant use, as on assembly line work, inspect and lubricate it every month. If it is subjected to ordinary occasional service, then perhaps lubrication every three months and inspection every six months is sufficient. But keep your load chain well lubricated at all times. A lubricated chain will *far* outlast a dry chain.

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tapped to take the screw with which the circular tool is to be held in position. Another step is then turned on the bar to provide a fit for a circular stop collar, as shown in the drawing. The stop collar should be a snug running fit on its shoulder, and of such diameter that half the difference between the diameter of the stop collar and the diameter of the radius tool will be equal to the required depth of the recess. Thus when, using the cross feed, the radius tool has been fed in until the OD of the stop collar is in contact with the surface of the bore, the radius has been cut to the required depth.

Where a boring and recessing operation is to be performed on a large batch of work, a considerable amount of time is saved by the use of this tool, inasmuch as the use of the tool eliminates all need for frequent withdrawal of the tool to check the depth of the recess. The principle of the

stop collar can, of course, be used in connection with boring bars in which ordinary single-point toolbits are used instead of the circular form tool.

Die Head Opening Mechanism

By HUGO M. ZSCHAU

Superintendent, Wodack Electric Tool Corp.

WE have occasion to thread $1\frac{1}{8}$ inch x 24-P. studs, of which only $\frac{3}{8}$ inch of the length is threaded, and have had a great deal of trouble due to stripping the threads. We also have to thread $\frac{5}{8}$ inch x 6-P special knuckle thread studs, of which only $\frac{1}{8}$ inch is threaded, and have found that the threads on these studs stripped unusually easy due to the fact that there were no sides on the threads



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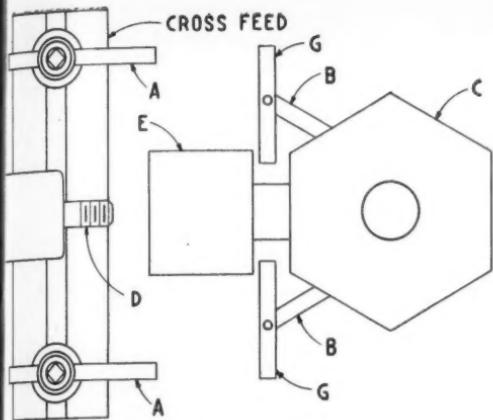
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Plan Drawing of Die Head Opening Device to Eliminate Tension on Threads

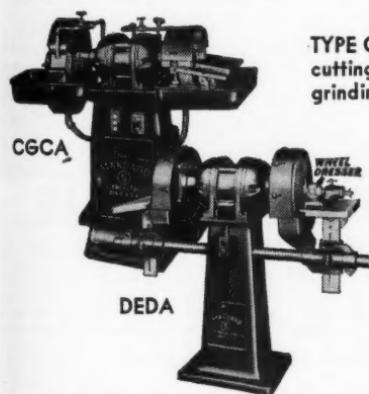
for the chasers to pull on—and any slight pressure means a distorted thread. This stripping occurred in spite of the fact that we were using tough alloy steel. We finally solved

the problem by the use of the device illustrated in the drawing.

The stops A were anchored to the cross feed carriage, as shown, then the steel strips B were anchored to the turret, each of the pieces B carrying a dog G which was hinged to the piece B by means of a bolt through the middle. When the turret C moves forward, carrying the die head E onto the work D, the dogs G strike the stops A and the inner ends of the two dogs are forced against the rear of the die head, forcing the die head to open without pulling on the threads.

The sizes of the parts used in this device can be made to suit the size of the machine and the job. The extra parts are of simple design and can be made quickly and easily.

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Jig Boring Plate for Milling Machine

By F. J. WILHELM

THE drawings herewith show the design and uses of an accessory known in our shop as a jig boring

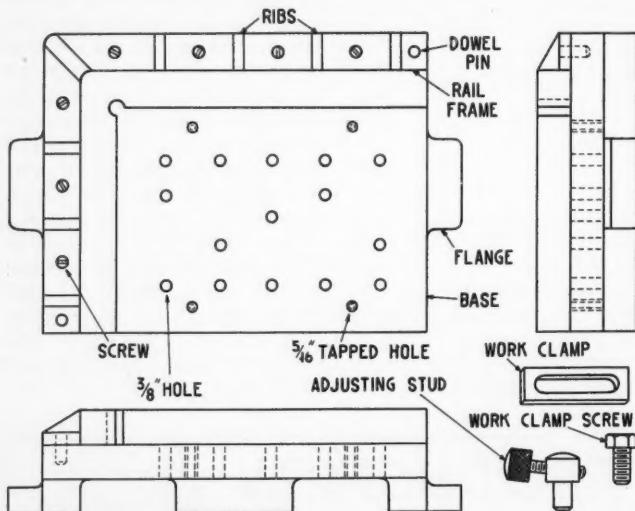


Fig. 1—Drawing Showing Design of Jig Boring Plate for Milling Machine

plate for a milling machine. Used with Johannson or similar gage blocks, the plate will simplify the task of setting up and machining holes in jigs and other pieces in

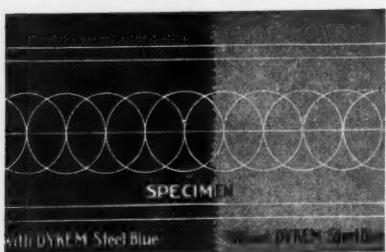
which close accuracy is a requisite.

The design of the plate is shown in Fig. 1. The rail frame must be machined smooth and the side frame must be absolutely square with the end, otherwise the finished work will be inaccurate. A flange is provided on each end of the plate to provide for anchoring to the machine table, and dowel holes are also provided so that the plate can be anchored if it is to be used in one position for a considerable length of time.

Reamed or ground holes of $\frac{3}{8}$ -inch diameter make it possible to locate the adjusting studs where they are most needed, and $\frac{5}{16}$ -inch tapped holes provide anchorage for the clamp screws with which the work is held in

position on the plate.

The drawing Fig. 2 shows the plate with a jig bushing plate in position for boring. The rail is squared up with the edge of the machine table



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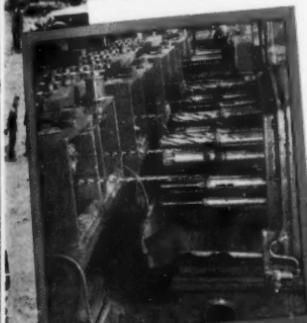
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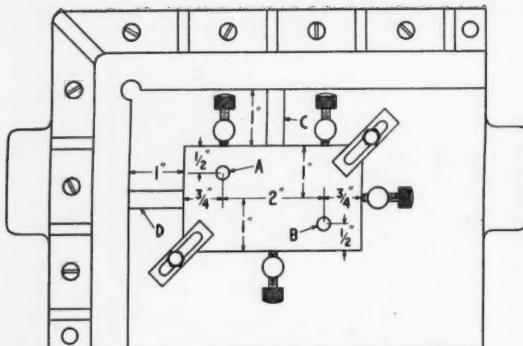


Fig. 2—Jig Boring Plate with Work Set Up for Machining

by means of an indicator and the hole **A** is bored first. The ball "wobbler" is then used to obtain the correct location. When this is done, 1.000 inch is added to gage block **C** and 2.000 inches to gage block **D**, then hole **B** is bored.

The two light clamps are all that is necessary. The adjusting screws

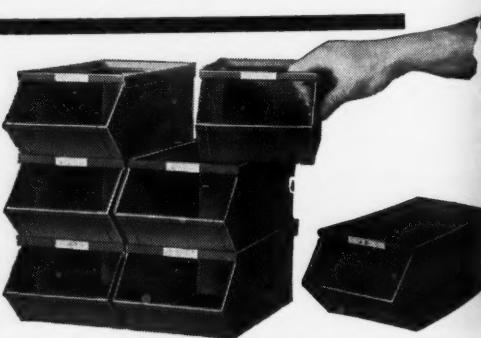
facilitate light movements of the workpiece while setting the job correctly with the gage blocks. The workpiece is set up on two ground parallel to provide clearance for the cutting tool at the bottom of the holes.

Centering Rolls for Irregular Work

By C. W. KNEFF

THE center square is all right for finding the center of a piece the end of which is perfectly round, but when the end of the piece is of irreg-

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want them
when you
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You'll save time, space and labor handling parts and materials when you use these patented STACKBINS. STACKBINS keep parts instantly accessible — eliminate waste hand motions — stack compactly to form units of exactly the right shape and capacity — make order filling or assembly work faster, easier, more efficient.

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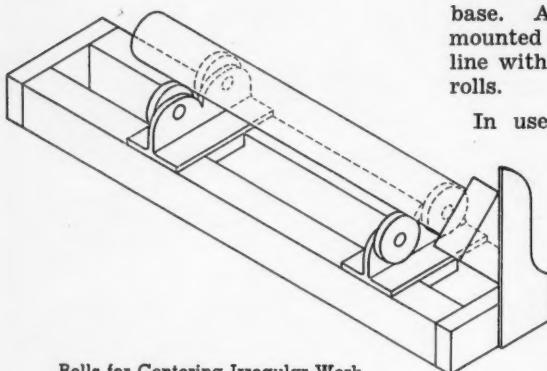
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Address _____

City _____ State _____

M. M.

ular shape, as often happens, the square is practically useless. To handle such work the centering rolls



Rolls for Centering Irregular Work

illustrated in the drawing Fig. 1 were designed, and on such work they have never failed.

The size of the device will be dictated by the size of the work upon

which it is to be used. The rolls are mounted on two sliding carriages which can be moved to any position on the two pieces which form the base. At one end of the base is mounted an upright straightedge, in line with the center line between the rolls.

In use, the work is laid on the rolls with one end of the work in contact with the straightedge. A line is now drawn with a scribe, then the work is revolved a quarter turn and another line is drawn. When this has been done four times the center has been located.

It is sometimes necessary to turn a bolt which has a square head, in which case it is necessary to drill a center hole in the center of the head. The center can be found easily by

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Timken Bearing
Self-Locking Turret—Infinite Spindle Speeds

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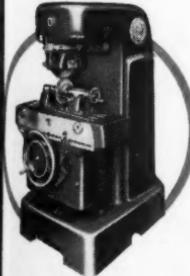
The MOREY 2G Timken Bearing Turret Lathe insures today's high speed production with a minimum of operating expense. More work at less cost with these money saving features: Self-Locking Turret...Vibrationless precision with an infinite variety of spindle speeds for every job... Back Gears instantly thrown in through extra large Twin Disc Clutch... takes full advantage of high speed and carbide tools. Modern design for modern production. Can be furnished with tooling.

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THE ELLIPTOID TOOTH FORM

Eliminates End Bearing—Solves Difficult Aircraft, Military & Naval Gear Problems



End bearing—load concentration of gear teeth at one end or the other—has always been a source of gear noise and early failure. In conventional gear practice it can be avoided only by extremely close tolerances—difficult and costly to maintain and which retard production rate.

Gear teeth given the Elliptoid Tooth Form on the Red Ring Rotary Gear Shaving Machine avoid end bearing. The Elliptoid tooth is thinner at the ends—thicker at the center or wherever it is desired to locate the bearing.

Machining this tooth is automatic—a patented optional part of the shaving operation—adds nothing to the very low cost of shaving.

With this method, smaller, less costly gears will stand up better under the same loading. For example, Elliptoid gear replaces conventional bull gear increasing service life 400%. When used in same aircraft gearing, service life was increased 200%—in truck transmission it provided an increase of 300% in service life. Similar records made in many other cases.

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NATIONAL BROACH AND MACHINE CO.

**RED RING PRODUCTS
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using the rolls in the manner described. When it is necessary to locate two centers in an eccentric, such as the piece illustrated in Fig. 2, the

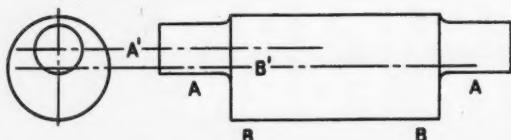


Diagram Illustrating Method of Finding Centers in an Eccentric

center in each part is found by placing on the rolls the part for which the center is desired. For instance, with the rolls located at **A A'**, the center line **A'** is obtained. With the rolls located at **B B'**, the center line **B'** is obtained.

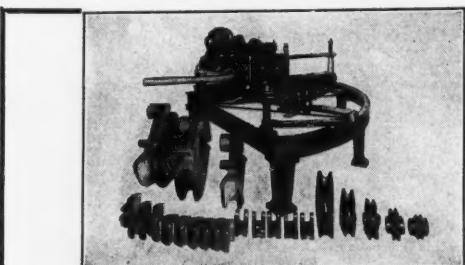
"Metal Cleaning in War Time." The Magnus Chemical Co., Inc., Garwood,

N. J., has issued a 50-page, illustrated handbook entitled "Metal Cleaning War Time." The handbook discusses detail the metal cleaning problems encountered in the production of shell, shell cases, fuses, other munitions and parts and objects involved in the production of material and equipment vital to the War Program.

In addition to the specific cleaning problems of munitions, the handbook also covers the outstanding cleaning operations required in the production of ordnance, small arms, transport equipment, and other metal items. Special em-

phasis is placed on the new Magna Emulso-Dip and Emulso-Spray methods of removing oily dirt, drawing compounds, and metal particles from metal objects to leave a clean surface.

The handbook is complete with man flow charts, illustrations, and diagrams of washing machines used in the manufacture of munitions and other vital metal objects. Several pages are devoted to cleaning in maintenance and repair shops and the important subject of the cleaning and protection of employees' hands and skin.



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HAND OPERATED TYPES in capacities of 1 in., 2 in., 3 in., 4 in. MOTOR OPERATED in three capacities, $\frac{1}{2}$ in. to 4 in., $\frac{1}{2}$ to 6 in., and $\frac{1}{2}$ in. to 8 in.

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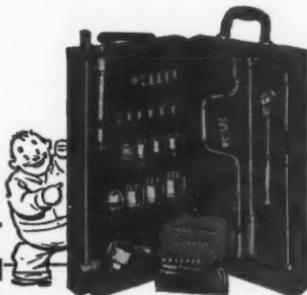


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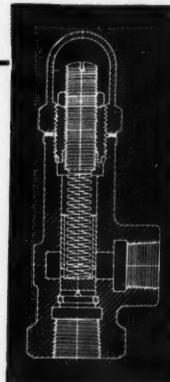
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NON-CHATTERING

Where specific pressures must be maintained. Especially on oil-burning equipment, machine tool hydraulic mechanism, ram presses, etc. Pipe sizes $\frac{1}{4}$ " to 2". Pressures 0 lbs. to 350 lbs.

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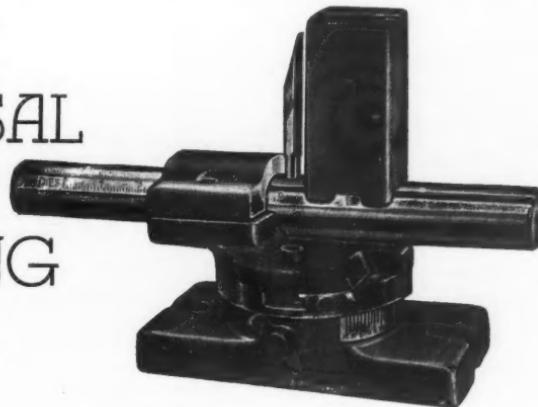
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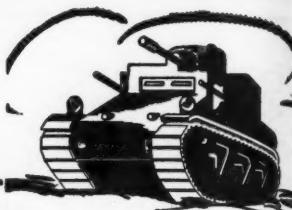
Chasers should be sharpened frequently and before they become dull. Equal grinding of all Chasers in a set produces the best threading results. Chasers ground by hand invariably cut unevenly and result in poor threads.

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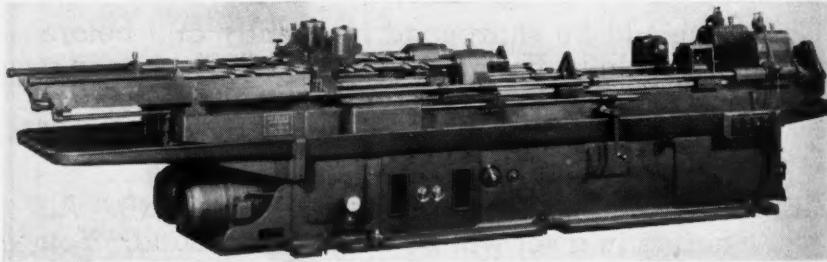
Ex-Cell-O Rifling Machine for 30 and 50 Caliber Rifles

Illustrated herewith is the Ex-Cell-O Rifling Machine for 30 and 50 caliber rifles which is now being manufactured by The Foote-Burt Co., Cleveland, Ohio. The machine is of the electrically controlled and hydraulically operated type with two operating stations, each of which is fully independent of the other.

The two main slide bases of the machine are mounted on a long cabinet type base. The hydraulic reservoir and control panels are located in one end of the base and the coolant tank and elec-

rifling groove to another. The tailstock supports the small end of the gun barrel and is provided with a motor-driven wiper to remove the chips from the tool bar and shock spring retained finger to retract the cutting tool before the return stroke.

The tool bar is supported and receives an endwise and a rotating movement from the sliding head, which actuates the tool feed and index operating bar. The hydraulic cylinder is mounted at the rear of the machine and actuates the sliding head through piston rod. The lead rollers are mounted directly in front of the hydraulic cylinder and are adjustable



Ex-Cell-O Rifling Machine for 30 and 50 Caliber Rifles

trical panels are located in the other end. Each slide base supports eight units; namely, index unit, tailstock, sliding head, hydraulic cylinder, lead rollers, lead bar, steady rest, and cutter feed unit.

The gun barrel is located and locked by means of the ball bearing journaled spindle of the index unit, which, as the name implies, is indexed to change the engagement of the cutting tool from one

for height and to suit helix angle.

The lead bar is supported at the rear by a sliding guide bracket, and at the front is provided with a driving connection to the sliding head. Due to its contact with the lead rollers, the bar rotates the driving head and tool bar during the endwise movement. The tool bar is supported between the tailstock and sliding head by the steady rest, which is supported on the slide base directly in front

of the sliding head.

After each cut through all the rifling grooves on the diameter of the gun barrel, the cutting tool is fed an adjustable amount by means of the cutter feed unit, which is mounted stationary at the front of the slide base. The feed member is built into a swinging arm, which is removed for loading barrels.

The coolant tank has a capacity of 50 gallons. The flow of the coolant is controlled by means of a relief and flow valve. The coolant relief valve is mounted on the side of the coolant motor and is adjustable from 15 to 30 lb. per inch. The coolant flow valve is mounted on the side of the bracket toward the center of the machine.

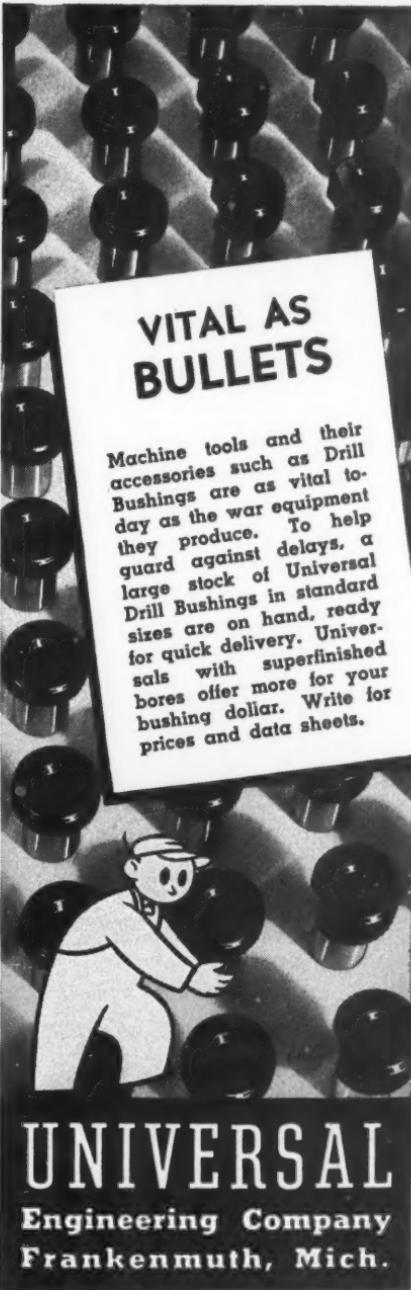
The hydraulic system, which includes a reservoir of 40-gallon capacity, is said to provide an infinitely adjustable rate of travel in each direction. Near the end of the stroke, this rate is reduced if it exceeds a certain maximum rate desirable to operate the feeding and indexing mechanism satisfactorily. A choice of two hydraulic pressures is available; namely, a low pressure to operate the machine with satisfactory cutters and a high pressure to finish the cut after the tool becomes dull.

The cutter bar consists of cutter head assembly and cutter bar extension and is retained in adapter, which is held in the taper nose of the sliding head spindle.

The Ex-Cell-O Rifling Machine is available in two capacities—30 caliber for 30-inch barrels and 30 and 50 caliber for 50-inch barrels. The 30 caliber machine is 44 inches wide, 162 inches long, and 41 inches from floor to center line of barrel. Net weight, approximately 12,000 lbs. The 30 and 50 caliber machine is 44 inches wide, 218 inches long, and 45½ inches from floor to center line of barrel. Net weight, 16,500 pounds.

Kling Downstroke Friction Saws

To meet the demand for high speed friction saws for fast production of bombs, shells, and bullets from solid or hollow, hot or cold steel stock, Kling Bros. Engineering Works, 1300 N. Kostner Ave., Chicago, Ill., announces a 36 and 48-inch downstroke friction saw with



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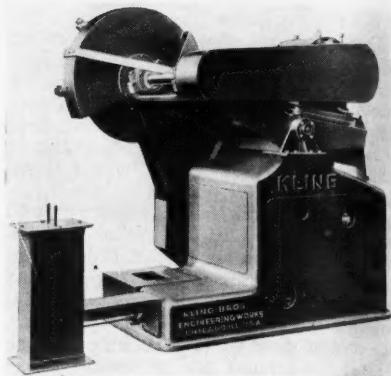
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Springfield, Mass.

"The Blade in the Plaid Box"



Kling Downstroke Friction Saw

hydraulic feed and main motor sizes of 40 and 75 h.p. Both units are streamlined, yet ruggedly built for constant heavy duty service. High rim speeds, simplicity of saw change, constant parallel plane of saw rotation, and elimination of end motion in swing frame are features claimed for each machine.

The swing frame is actuated by means of a double-acting hydraulic cylinder through a 1½ h.p. motor and pump which delivers oil at constant pressure during the cut and at low pressure while idling between cuts. The operating pressure is adjustable to provide the desired operating load on the main motor, which remains uniform during the entire cut. The rate of downstroke of the saw blade is adjustable up to 2.8 inches per second, while the upstroke is fixed at 4.35 inches per second.

The saw blade is shielded with a fabricated hood, and a cooling system is provided for properly directing water to dissipate heat from the blade rim. Water and operating controls are located in a pedestal control stand in front of unit to provide operator with clear vision of all operations. Finish pads are provided for accommodating suitable holding fixtures.

**Carboly Gun Drills for 30 and 50
Caliber and 20 mm. Gun Barrels**

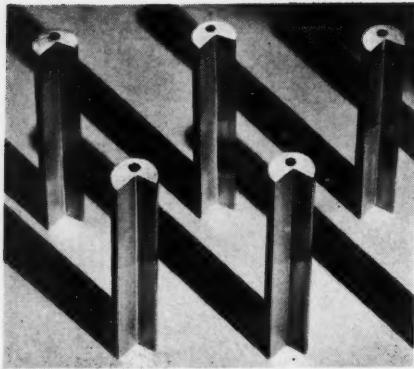
With completion of experimental production runs resulting in an increase of $\frac{1}{3}$ to $\frac{1}{2}$ in output of drilled gun barrels



Girls have operated our "ROCKWELL" Hardness Testers for many years. This drawing was made ten years ago, based on a photograph taken then. You do not need men for these testers now.

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WILSON
MECHANICAL INSTRUMENT CO., INC.



Close-up of the new solid Carboloy drills designed for gun-drilling of 30 and 50 caliber and 20 mm. gun barrels. Production development work is considerably advanced on Carboloy drills for 37 mm. and 44 mm. gun barrels, also. The tips, it will be noted, are brazed to steel shanks which are in turn attached to rifle-drilling tubes. Finish grinding of cutting edge is handled by the user to suit specific requirements of individual production set-ups.

per man-hour and machine-hour, Carboly-tipped rifle drills for 30 and 50

caliber and 20 mm. gun barrels have been placed in production by Carboloy Co., Inc.

The new gun drill is to be furnished with the Carboloy tip brazed to a steel shank which in turn is attached to the user to his regular gun drill tail. Cutting edges are not finish ground since experience has shown that optimum angles will vary among different plants depending on particular machine conditions, materials to be cut, and on. Final cutting edges are therefore ground by the individual user just as re-sharpening such gun drills.

The grade of Carboloy selected for new gun drills is designed to give a cutting action. The result is a finish which is definitely smoother than that secured with conventional gun-drills, according to Carboloy engineers, while at the same time the hole is also straighter than experience seems to indicate. Reason for this is that there is less tendency of the Carboloy-tipped drill to squeeze tight in the barrel.

Production experience to date indicates an average of some two dozen 50-caliber barrels per grind of the tip, with an average

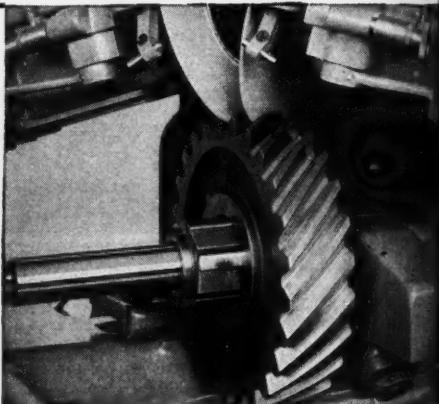
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Cut and ground on Maag Machines in our Jersey City plant to an accuracy of profile up to .00012" and to an accuracy of pitch up to .00024". Eccentricity of pitch circle, .00060".

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without grinding.**

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Shell End Mills
Face-Milling Cutters
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WHERE TIME COUNTS you can count on McCrosky tools. McCrosky's JACK-LOCK Face-Milling Cutter gives longer blade life, guarantees shorter down-time. When milling speeds and feeds are stepped up, the McCrosky JACK-LOCK Wedge insures rigidity. Adjusting screws behind the blades mean a minimum of blade stock removal in resharpening.



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age of 12 to 18 barrels per drill produced per shift. A prime advantage of the new drills, therefore, is the vastly reduced down-time for changing drills. Indications are that it is usually possible to step up drill r.p.m. when Carboloy tips are used, thereby obtaining a further increase in production.

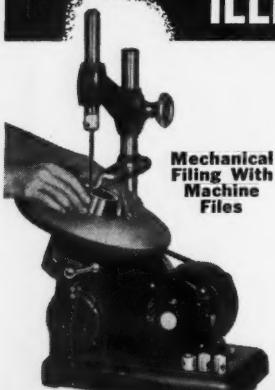
A factor contributing toward life of the carbide drill, it is claimed, is that greater wear-resisting qualities result in less wear on the OD of the tip. Since gun drills are tapered back approximately 0.001 inch per inch of length, the entire tip may be used up in gun drilling while still holding to tolerances of plus or minus 0.001 inch, the limits on hole size for 50 caliber barrels before reaming. The steel shank to which the carbide tip is brazed, incidentally, has a 0.002 inch smaller OD than the drill tip.

A further advantage stated for the new carbide drills is that in case of breakage the barrel may be reclaimed. The Carboloy drills are designed so that they may be placed in production without requiring changes in equipment with the exception of feeds and speeds. The new

drills may be attached directly to existing gun drill tubes when present HSS drills are worn off. The Carboloy tip and steel shank is provided with a longitudinal oil hole.

Cleveland Crane Graphic Vol. 1, No. 1, an eight-page interesting bulletin now available from The Cleveland Crane & Engineering Co., 1111 E. 283rd St., Wickliffe, Ohio, illustrates and describes the use of various Cleveland Tramrail systems in warehouses, foundries, arsenals for use in loading shells, plants for die storage and handling, sheet handling, and so on. Steelweld Bending Presses and some of their applications are also treated in the bulletin, copy of which can be obtained free upon request.

"Stamping Single and Multiple Characters" is the title of a 16-page supplement to Catalog No. 146 now being distributed by Jas. H. Matthews & Co., 3942 Forbes St., Pittsburgh, Pa., illustrating and describing steel stamps and various steel type holders for numerous stamping needs. Copy of Supplement A, free upon request.



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"Molite B" Columbia Tool Steel Company
"Rex-T-Mo" Crucible Steel Co. of America
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"Megul" Jessop Steel Company

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A straight side shop box with rigid handle and hook hole each end. Excellent for shop use where stacking feature is not required.



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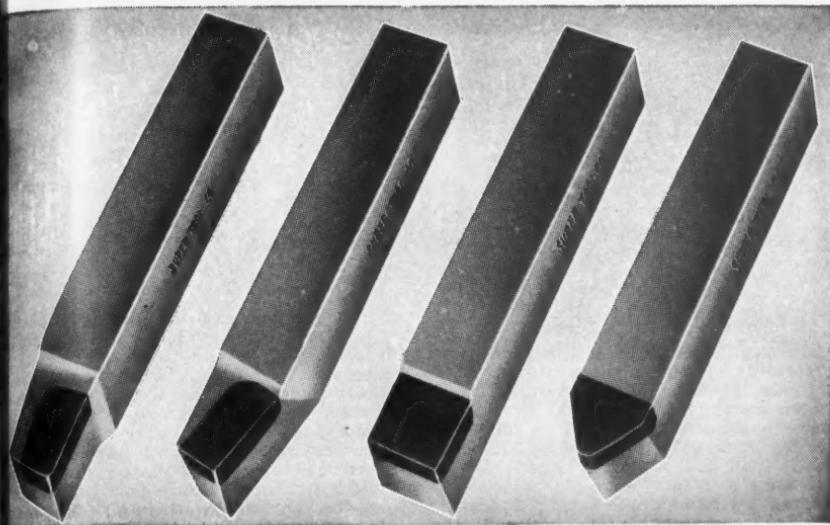
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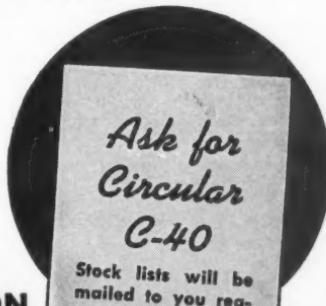
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NEW SHOP EQUIPMENT

H-P-M Metal Stretching Press

A press of versatile design for use in performing stretching operations on a large variety of dies and metals, to be known as the H-P-M Metal Stretching Press, has been introduced by The Hydraulic Press Mfg. Co., Mount Gilead, Ohio. The main platen, which is 8½ feet long x 1 foot wide, is raised and lowered by two double-acting hydraulic cylinders, one at each end of the platen. The cylinders have a 24-inch stroke and total capacity of 150 tons, and each may be raised or lowered independently of the other. The main platen can also be very easily turned 90 deg., at which position it is actuated by two similar cylinders located inside the press frame.

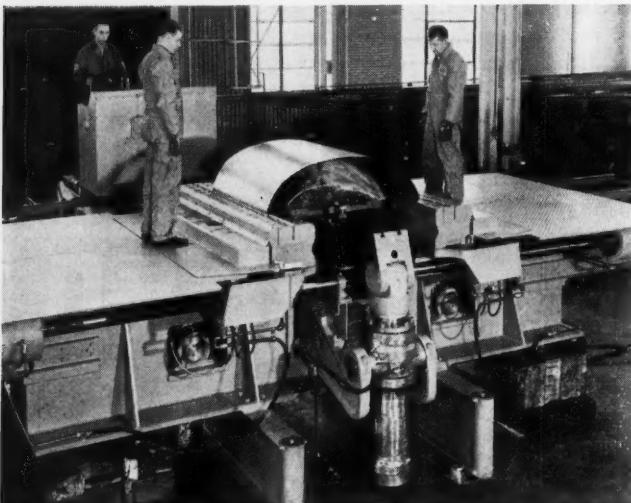
The clamp jaws are traversed hydraulically by four double-acting hydraulic cylinders, two of which are located at each end of the press. The

cylinders have a total pulling capacity of 21 tons and provide an 18-inch stroke to each end of the press. The return lines on the cylinders are piped through two adjustable pressure relief valves, one for each end of the press. Thus, if the use of a particular die makes it necessary for the clamp jaws to move in toward the main platen during the stretching operation, this movement can be controlled through the relief valves.

For positioning the clamp jaws, four gear motors are provided, one at each corner of the press, which drive threaded shafts. By traversing the jaws with these motors, the jaws may be located at any angle (up to their maximum angular adjustment of 15 deg. in a horizontal plane) to the main platen. The threaded shafts provide a 43-inch stroke adjustment each, thus giving the clamp jaws a total horizontal stroke of 122 inches. Of this 122-inch

stroke, 36 inches are controlled by the hydraulic cylinders and are available during the stretching operation; the remaining 86 inches are controlled by screw adjustment and are used for positioning the jaws. The maximum and minimum distances between jaws are 150 and 28 inches respectively.

The clamping action of the jaws is produced by hydraulically ener-



H-P-M Metal Stretching Press Ready for Operation

gized toggle joints. To ensure the gripping action of the jaws, the face of the toggles against which the metal sheet lies is surfaced with a "bead" running the full length of the jaws. The housing for the clamps is of a very rigid and sturdy construction.

The operation of the H-P-M Metal Stretching Press is conveniently controlled from a compact stand on which are located hand levers and push buttons. From his vantage point on the stand, the operator can readily see and accurately control the movements of the pressing members, thus enabling efficient stretching operations to be performed.

Pressure is generated for the H-P-M open circuit operating systems by two H-P-M Hydro-Power Radial Pressure Generators and one H-P-M Hydro-Power Gear Pump, all driven by one electric motor. Each of these pumps is part of its own complete operating system, thereby providing individual control to the separate pressing members.



Finished Piece Formed by Processing on H-P-M Metal Stretching Press

Taft-Peirce 6-Inch Rotary Surface Grinder

A 6-inch rotary surface grinder having a tilting wheelhead which is said to make the machine particularly suitable for difficult shoulder work has been introduced by The Taft-Peirce Mfg. Co., Woonsocket, R. I. Easily operated, the machine is constructed for long life, with hardened

MAGNETIC CHUCKS

No. 618 Standard Type Rectangular Magnetic Chuck. Available in sizes 4" x 8" to 30" x 96". Ask for Circular W4.

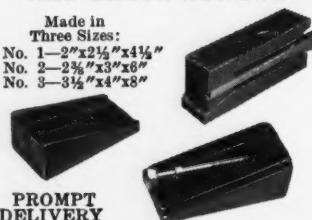
SET YOUR MACHINES LEVEL THE EASY WAY!



EMPCO Machine Jacks simplify the problem of leveling machines shifted for more efficient plant lay-out. No more cement base and floor bolts with their periodical shimming. Simply place EMPCO Jacks under each machine on your present floor, apply a wrench to the "hex" screw head and presto! . . . a level adjustment as precise as you want.

A LEVELED MACHINE DOES BETTER WORK AND LASTS LONGER

Made in
Three Sizes:
No. 1—2 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " x 4 $\frac{1}{4}$ "
No. 2—2 $\frac{3}{4}$ " x 3 $\frac{1}{2}$ " x 6"
No. 3—3 $\frac{1}{2}$ " x 4" x 8"



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and ground ways and ball bearing travel of saddle and column.

The Taft-Peirce 6-inch Rotary Surface Grinder is designed to impart an unusually high degree of flatness and finish to the plane surfaces of gages, tools, and parts. Exceptional accuracy of flatness is said to be readily maintained, with grinding time and wheel wear reduced to a minimum.

An outstanding feature of the grinder



Taft-Peirce 6-Inch Rotary Surface Grinder

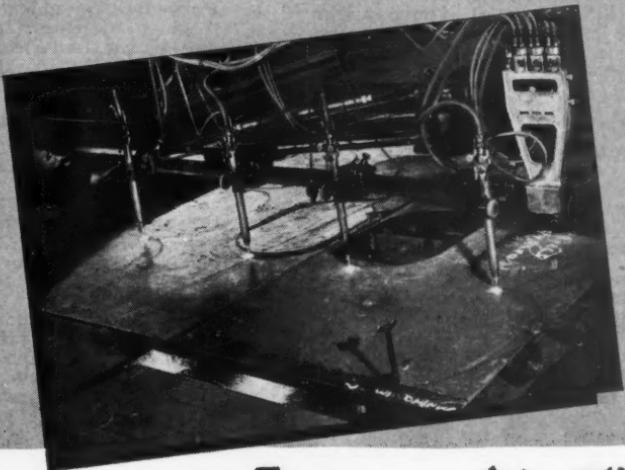
is the wheel spindle, which swivels in a vertical plane about the center of the wheel. The spindle is carried in an accurately bored cast iron block mounted between two pairs of circular dovetail slides, thus permitting the spindle to be swiveled about the wheel center through an arc from horizontal to 30 deg. below center. A simple adjustment of the spindle block is said to make possible operations which formerly required difficult and time-consuming setups of tools. Since wheel clearance can be readily provided, grinding to sharp corner or shoulder is said to be a simple operation.

The ball bearing quill-type wheel spin-

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Now 4 cuts in 2 min. 42 sec.

... INSTEAD OF 3 MIN. 45 SEC.



USING THE NEW **Airco '45'** *High Speed MACHINE CUTTING TIP **

At this plant, an Airco Travograph is flame cutting four identical shapes, 77" in periphery, from 5/16" steel plate in 2 min. 42 sec. — with the new Airco "45" High Speed Machine Cutting Tips.

1 min. 3 sec. — this is the saving in time now made possible by the Airco "45" in this multiple cutting operation, which until recently required 3 min. 45 sec. with conventional tips.

Airco "45" was developed to bring you maximum cutting speeds — at a time when

speed became essential to the country's war efforts. It increases the speed of machine gas cutting by 20 to 30% — without sacrifice in the quality of the cut and with no increase in oxygen consumption.

If your plant is engaged in war production and utilizes Airco oxyacetylene machines for cutting steel up to 8" thick, we urge you to ask your nearest Airco office for further details or to request our 8-page bulletin on Airco "45".

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idle is driven directly from a 1 h.p. motor at 3,600 r.p.m. Motor control is provided through a toggle switch mounted on the right side of the pedestal below the saddle. The spindle, being a complete and self-contained unit, can be removed.

The work spindle, which is made of hardened alloy steel, is mounted on pre-loaded precision ball bearings and carried in a housing which provides suitable support as well as adjustment through its mounting on the machine saddle. The spindle is driven through a worm and gear from a $\frac{1}{4}$ h.p. motor mounted at the base of the spindle housing. The magnetic work chuck, which has a work surface of 6 inches in diameter, is of special design, thus enabling small pieces of work to be held at the center of the faceplate.

A handwheel located at the right of the machine operates the elevating mechanism through a telescoping shaft and gearing. The handwheel is graduated in half-thousandths of an inch, the graduations being approximately $\frac{1}{6}$ inch apart, thus making possible extremely accurate reading and setting.

All castings of the machine are high

quality grey iron, heat treated and carefully seasoned. The pedestal and all supporting parts of the grinder are heavily ribbed to assure rigidity and eliminate vibration. The feet of the pedestal are recessed to accommodate four felt vibration-dampening pads, which are supplied as standard equipment. Oil is supplied to all points requiring lubrication, except the wheel spindle and grease-sealed bearings by a one-shot system located in the pedestal.

Specifications of the Taft-Peirce 6-Inch Rotary Surface Grinder are as follows: chuck, 110 or 220 volts, d.c.; work surface of chuck, 6 inches in diameter; distance of chuck from floor, 40 inches; distance from chuck to wheel, 12 inches; r.p.m. of work spindle, 120; motor of work spindle $\frac{1}{4}$ h.p., 2,450 r.p.m., 220-440 or 550 volt 2 or 3 phase, 50 or 60 cycles; cross travel of saddle, 4 inches; vertical travel of wheelhead, 12 inches, 0.50 inch travel per revolution of handwheel; standard r.p.m. of wheel spindle, 3,600; motor of wheel spindle, 1 h.p., 220, 440 or 550 volts for 2 or 3 phase, 50 or 60 cycle a.c.; grinding wheel, 7 inches x 1 inch thick; hole in grinding wheel, 1 inches.

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principle, also other
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Despatch Heat Treating Furnaces applying the unique Despatch heating principle are particularly suited to modern metallurgical requirements. They provide speedy, accurate heat treatment of low carbon steel, high carbon steel, alloy steel parts, aluminum alloy, magnesium alloy, brass and other non-ferrous castings, forgings sheets and shapes. Built in all sizes and types to suit your production problem.

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CELLULAR NOT "SOLID"



NEW-TYPE GRINDING WHEEL GRINDS COOLER, IS FREE CUTTING, 2 TO 5 TIMES FASTER

From three years of patient research in our laboratories comes Por-OS-way. It is a better precision grinding wheel—new in principle, new in results.

AIR SPACES SPEED GRINDING. Instead of being sandy, the structure of Por-OS-way is cellular and "stringy" like a sponge. Millions of cells cool each grinding point between contacts.

RESULT: Burning is practically eliminated. The wheel runs cool. It cuts deeper— $.010"$ or more—or handles your regular cut at faster speed. Actual tests show increases in production per man, per machine, of 100% to 400%.

FOR ALL SORTS OF WORK. Grind hard tool steels with Por-OS-way. Thanks to a new

vitrified bond, Por-OS-way holds its corner, requires a minimum of dressing. Try it on softer materials of all kinds: aluminum, copper, tin, wood, rubber, plastics. The porous structure reduces loading to a minimum.

CUSTOM MADE—the size of air cells in Por-OS-way, grain and grade vary to meet your peculiar requirements. Por-OS-way is not a stock wheel.

MAKE A TEST—NOW! Other manufacturers are using this new-type wheel—and profiting! Why not you? It's tested and proved—not an untried experiment. Write for booklet. The "prescription" blank will help determine the specific wheel for your use.

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P3 Baby Gusher Pumps are available in external right or left discharge models, flange - mounted and immersed models.

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1817 READING ROAD, CINCINNATI, OHIO
LARGEST EXCLUSIVE BUILDERS OF COOLANT PUMPS

**"Roxaneal" Protective Liquid
Coating for Glass**

Known as "Roxaneal," a liquid coating which when applied to glass is said to prevent it from flying during raids is now being manufactured by Roxalin Flexible Finishes, Inc., Elizabeth, N. J. The material is not claimed to stop glass from fracturing but, according to the manufacturer, tests have proved that it will keep broken glass in place, thus preventing dangerous glass splinters from flying.

Roxaneal is available in a clear transparent form which does not obstruct vision or light, also in a blacked



Plain Glass Coated with Roxaneal. Note how Glass Remains Intact After Fracturing

type. The material may be applied by brushing on the interior of clean glass. According to the manufacturer, windows to which Roxaneal has been applied may be cleaned when necessary with mild soap solutions without affecting the strength of the protective film.

**Federal Open-Back Inclinable
Press with Multiple Dial Feed**

An open-back inclinable press having a multiple dial feed designed to permit unusually high speed press operation with accuracy and safety assured is announced by the Federal Press Co., Elkhart, Indiana.

All moving parts of the dial feed are enclosed, except the dial plate itself, thus reducing the possibility of injury to operator. Indexing is positively ac-

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The New

Dazor *Floating* Lamps

INCANDESCENT

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At the pilot's touch his plane responds with an instant dive, climb, bank or roll. At your touch the Dazor Lamp glides just as speedily to any position. You float it up or down, right or left, in, out or through an arc... with the advantage that the Dazor stays put wherever you stop it. No locking; the enclosed Patented Spring Balance holds the arms firm, anywhere in a 6-ft. spherical field.

Correct, flexible Dazor light, controlled at the bench, machine or desk, relieves eye strain...lowers costs...speeds production. Dazor Floating Lamps serve on thousands of government and industrial jobs. A leading electric wholesaler features them in your locality, both Incandescent and Fluorescent models. See him, or write for literature and distributor's name — today!

All Models in
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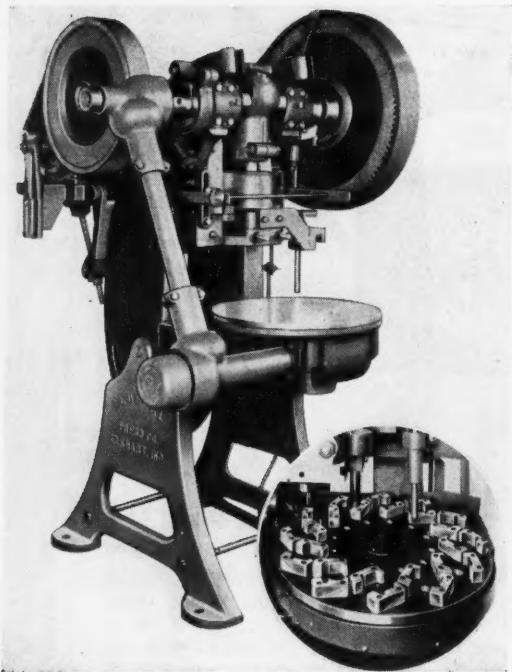


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Federal Open-Back Inclinable Press
with Multiple Dial Feed

greater speed, automatic loading and ejector mechanism can be furnished.

The Federal Press with Multiple Dial Feed can be adapted to handle a large variety of secondary operations. The simple design and positive action of the dial feed are said to permit a wide range of tooling for numerous jobs. The Federal Press with Dial Feed is available in eight sizes with capacities from 6 to 80 tons. Dial plates on the Nos. 0, 1, and 2 presses have 10 stations and on Nos. 3, 4, 5, 6, and 7 the dial plates have 12 stations.

The Federal Open-Back Inclinable Press with Multiple Dial Feed is of precision construction throughout. According to the manufacturer, the press is checked from points to a tolerance of 0.001 inch, and the ram is bored for exact alignment with the extra

accurately made through a cam and gear arrangement in connection with the crankshaft. The cam, which is of a special design, smooths out the indexing motion to obtain speed and permits the dial to be indexed during any part of the revolution of the crankshaft from 90 to 180 deg. In this manner, a long or short dwell of dial can be obtained, thus allowing operator whatever time necessary to inject the work into the fixture in the dial station. For even

long V-ways of the machine. Additional design features include safety lock feature which enables dies to be set and adjusted while flywheel is in operation; incline adjustment, operated from the front of the press; Timken bearings for flywheel; large size crankshaft bearings hand scraped to assure accuracy, and vertically split bearing caps which rest on reinforced frame, thus transmitting shock from thrust and return stroke directly to frame.

COMET Internal Threading and Boring Tools

For holes from $\frac{1}{8}$ upwards 15 Different Sizes
The accurate thread angle is maintained through sharpening until tool is entirely worn down—long cutting surface for regrinding.

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Agents wanted! **COMET TOOLS INC.**
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*Spec. for
Inclined
Press*

Welded STEEL Machine BASES

Made to Fit
YOUR PRODUCT
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When you place an order for Welded Machine Bases with Mahon, you can be sure of two things—you will get delivery as quickly as it is humanly possible to produce them—and you can be sure they will accurately fit the machines for which they are made. Mahon craftsmen are trained experts. They have the years of experience and knowledge—backed by completely modern equipment—to do a thorough job without debate or delay. They will follow your blueprints exactly.

Welded Machine Bases, as produced by Mahon, are lighter and less cumbersome; they will match the quality and fine appearance of your own product; and you will not be subjected to machining delays to make them fit. Send in your blueprints. You will receive quotations—promptly.

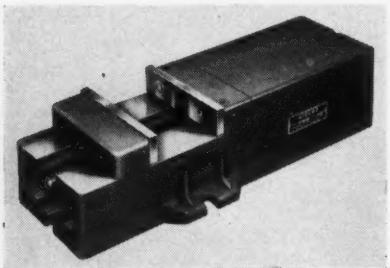
THE R. C. MAHON COMPANY
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MAHON

Airlox Senior Pneumatic Vise

Developed to meet the need for a tool combining the quick action of air with a positive grip on work, the Airlox Senior



Airlox Senior Pneumatic Vise

Pneumatic Vise illustrated herewith has been placed on the market by Production Devices Inc., 1169 Main St., East Hartford, Conn. The vise is designed for use in performing milling, broaching, planing, tapping, shaping, drilling, assembling, and bench operations.

The vise utilizes a single-acting air piston operated by leverage, which provides

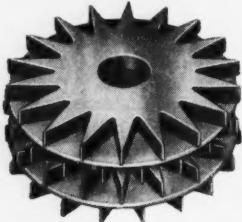
great power to the movable jaw. Through the use of a trip valve, production can be increased by synchronizing the opening and closing of the vise jaw with the movement of the machine to which the vise is applied.

Features of the Airlox Senior Pneumatic Vise include completely enclosed mechanism, instantly adjustable jaw ground jaw faces, special alloy castings, flanged design for swivel base, and so on. Specifications of the unit are as follows: length overall, 22 $\frac{1}{2}$ inches; width overall, 8 $\frac{1}{2}$ inches; height overall, 5 inches; weight, approximately 75 lb.; jaw width, 7 inches; depth, 1 $\frac{1}{2}$ inches; jaw hole spacing, Brown & Sharpe No. 4 or specification; jaw travel, $\frac{1}{2}$ inch; maximum opening between jaw castings, 4 inches; maximum air consumption, 10 cubic feet per operation.

Standard Type CCGA Carbide Tool Grinder

Designated as the Type CCGA, a combination tool grinder featuring a combination arrangement which permits both rough and finish grinding operations to be performed on the machine has been placed

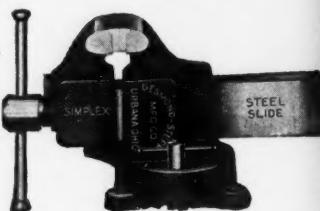
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THE DESMOND-STEPHAN MFG. CO.

Urbana, Ohio

CP HICYCLES CUT GRINDING TIME

BECAUSE OF HIGH SUSTAINED SPEED
REMOVE MORE METAL IN GIVEN TIME

Maintenance Low Despite High Speed

NEW YORK — Foundries and other metal-working plants in which grinding is an important operation — and potential bottleneck — are cutting grinding time and speeding overall production with CP Hicycle Electric Grinders. With their high sustained speed, light weight and perfect balance, CP Hicycle Grinders not only remove more metal but also materially lengthen the life of grinding wheels.

Plant records show that CP Hicycle Electric Grinders, Sanders, Drills, Reamers, Nut Runners, etc., have the lowest maintenance costs of any type of portable tools. Write for complete data.



↑ SIX CP HICYCLE ELECTRIC GRINDERS replaced eight grinders of another type in a well-known plant. Illustrated is one of five models of Chicago Pneumatic Hicycle Electric Angle Grinders and Sanders.



↑ WITH THEIR HIGH SUSTAINED SPEED, Chicago Pneumatic Hicycle Grinders remove more metal in a given time. Because Chicago Pneumatic Hicycle speeds do not fluctuate, the emery wheels last longer.



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↑ HEAT CONDUCTION FROM MOTOR to housing through ribs . . . ventilated rotor . . . ample cooling air from fan . . . exhaust over spindle case (not in operator's face) make the CP Hicycle cool running grinders.

← SANDING DOWN EDGES of hot oil washing machine tank. Light weight and high sustained speed make the CP-401 ideal for all types of angle sanding.



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Cling-Surface gives lasting grip—makes slack-running belts a practical reality. Delivered power is stepped-up as much as 40%, with prolonged life of belts, bearings and shaftings.

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with

CLING-SURFACE
Belt Treatment

SPEED-UP
PRODUCTION
★
REDUCE
WEAR

on the market by The Standard Electric Tool Co., Burns and Eighth Sts., Cincinnati, Ohio. The machine is equipped with a 3 h.p. 1,150 r.p.m. motor for use with an 18-inch diameter x 2½-inch face straight grinding wheel, and suitable flanges are furnished to accommodate this size wheel with a 10-inch diameter hole. The outside diameter of the wheel flange is 15 inches so that actual wheel waste is but a 1½-inch thick ring. The motor is reversible through a reversing magnetic starter and separate three-button push button station.

On the opposite end, the spindle is



Standard Type CCGA Carbide Tool Grinder

equipped with a steel plate to accommodate mechanically mounted 14-inch diameter cylindrical wheels for face or finish grinding. A table is finished at this side of the machine which not only can be adjusted to various angles, with suitable graduations provided, but may also be adjusted to compensate for wheel wear and raised or lowered to permit grinding various size tools.

The machine illustrated has a wet grinding attachment and separate toggle switch for controlling the motor driven pump. The machine may be used for grinding dry or with the wet grinding attachment. If desired, the machine can be supplied for dry grinding only without attachments. The machine is available in 1 h.p. 10-inch and 2 h.p. 12-inch sizes.

Wales Notching Die

The Strippit Corp., 1200 Niagara St., Buffalo, N. Y., announces the addition of

43 YEARS OF EXPERIENCE IN MAKING BETTER STANDARDS

A FAMILY TRADITION IS YOUR GUARANTEE OF QUALITY



BEHIND Elmer Ellstrom, the founder of the Dearborn Gage Company, lies 43 years of experience in the manufacture of precision instruments. In 1899 he started as an apprentice under his father, Hjalmer Ellstrom (working with him on the original development of the gage block) in the great Swedish Arsenal in Eskilstuna.

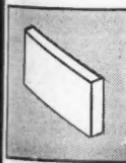
With this early training in precision measurement gained under the guidance of his father, together with the experience gained in plants both in the United States and Europe, Elmer was convinced that there could be a more satisfactory standard made that would withstand severe production use and at the same time require less care in handling.

With this thought in mind and with the help of his sons, Elmer, Olof and Ralph, he applied his skill to the problem of developing such a gage block through the process of chromium plating.

After many trying experiments and much discouragement, this process of successful chromium plating gage surfaces was perfected, so that chromium could be applied and finished as accurately as steel. These finished accuracies were then verified by the national Bureau of Standards.

Thus the Ellstrom family made the first major improvement in the manufacture of gage blocks since their original development in Eskilstuna, Sweden.

This improvement has not only brought to Elmer Ellstrom and the Dearborn Gage Company, world-wide recognition as the manufacturers of the finest gage blocks, but it has also given industry a standard of measure which can be relied upon for many times the life of any other standard. This is doubly important now, when the saving of time is so vital to Victory.



DEARBORN GAGE COMPANY
22032 BEECH STREET **DEARBORN, MICH.**

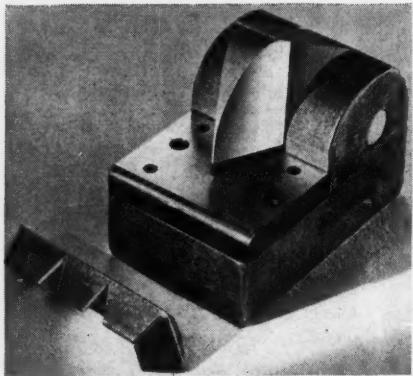
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Wales Notching Die

the notching die shown here to its line of Wales punching and notching equipment. The die is designed to notch 11 gauge angle iron at points up to the corner. Where angle iron is to be bent, the die is said to leave a portion of metal unnotched in the corner to permit easy and exact bending.

The Wales Notching Die is completely

self-contained and has nothing to attach to the ram of the press in which it is used. The punch and die of the device are constructed so as to remain in constant alignment. A series of these dies on a T-slotted plate are said to produce a complete notching pattern in one stroke of the press.

With the Wales Notching Die, pattern setups can be quickly made. The flexibility of the die enables pattern setups to be readily made by positioning the unit through the use of a templet and then locking onto a T-slotted plate. The die is available in sizes to accommodate various notching operations.

"Precise 35" Hand Grinder

A midget size portable electric tool to be known as the Precise 35 Grinder is now being marketed by Precise Products Corp., Racine, Wis. The tool can be arranged for grinding, cutting, engraving, piercing, carving, polishing, and so on materials of various types. The slender spindle head is said to make the unit suited for the most exacting internal work in openings as small as $1\frac{1}{2}$ inches in diameter and up to 6 inches in depth.

The Precise 35 Grinder is equipped

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★ There's a vital link on which the entire chain of victory production depends . . . the drill jig bushing! Here, at Acme Industrial Company, production of precision jig bushings is, and always has been a specialty.

Our two complete jig bushing standards, the A.S.A. and our own Acme Standard, provide a much wider selection that eliminates many time-consuming and costly special bushing requirements. Yet, if you need a special, Acme is ready to produce a wide variety with reasonably fast delivery.

Rotating Seal Design, Flat Lapping

Another Acme specialty is flat lapping, a production process that can produce surfaces to within $.000005"$ from absolute flatness. This makes possible rotating shaft seals of strict uniformity—abolishes expensive re-assembly and re-testing due to faulty sealing surfaces. Without cost or obligation, your blueprint or complete seal in our hands will bring specific recommendations.



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○ Springfield, Ohio
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Wheel & Machine
Co.
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Tel. 4651

○ St. Louis, Mo.
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Now in nine major distributing centers, "Safety" warehouses have "SAFETY" Grinding Wheels on their shelves—to bring stock wheels to you faster when you need them.

Now in eleven key vantage points, there are "Safety" sales engineers at your call to help you with your particular grinding problems as they arise in your war-production.

Back of these men and sources of supply are "Safety's" modern factory and research laboratories equipped to bring you "the right wheels, when and where you want them." To insure prompt, dependable service, get in touch with the "Safety" warehouse or sales office nearest you. Let "SAFETY" fill your requirements promptly.

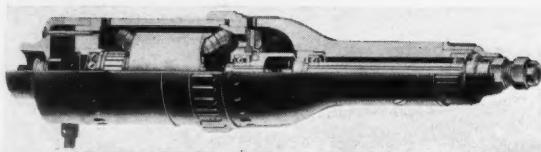
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THE SAFETY GRINDING WHEEL & MACHINE CO.

SPRINGFIELD, OHIO

ESTABLISHED 1891



"Precise 35" Hand Grinder

with a universal motor, developing approximately 1/7 h.p. at speeds from 20,000 to 35,000 r.p.m. under load. The motor shaft and high precision spindle with its high speed chuck revolve on four precision machined ball bearings and are joined by means of a self-aligning insulating elastic coupling, thus eliminating vibration and excessive wear of gears, belts, and so on. Bearing chambers are totally enclosed against dirt and grit, thereby preventing any evaporating of lubricating oil and permitting forced ventilation of fan to keep inner motor parts clean without the use of an air filter.

The Precise 35 Grinder is 11½ inches long, 2½ inches in diameter and weighs 35 ounces.

TRICO OILERS

**SAVE—TIME
OIL—WORRY**

No guesswork — bearing failures — idle machine time or waste when you modernize with TRICO AUTOMATIC OILERS.

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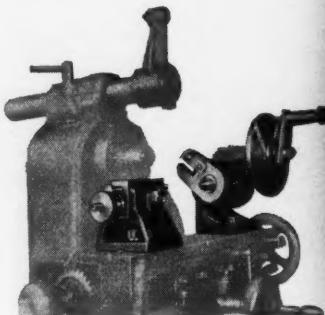
TRICO FUSE MFG. CO.
Milwaukee . Wisconsin

Jefferson 6-Inch Tilting Dividing Head

Jefferson Machine Tool Co., 750 W. 4th St., Cincinnati, Ohio, is now marketing the 6-inch tilting dividing head shown in the accompanying illustration. The headstock is provided with

swivel graduated up to 100 deg., and can be tilted 5 deg. below the horizontal and 5 deg. past the perpendicular.

The worm wheel of the headstock has a ratio of 40 to 1 and is keyed to the headstock spindle, which is provided with take-up collar for end thrust. The spindle, which is 1½ in. in diameter, has



Jefferson 6-Inch Tilting Dividing Head

a No. 7 B & S taper and is provided with ½-inch hole through the center. The nose of the spindle is threaded 12 threads to the inch.

The Jefferson 6-Inch Tilting Dividing Head is equipped with ½-inch table T-slot tongues and is supplied complete

EVANS HIGH SPEED STEEL REAMERS



LOOK AT THESE FEATURES

- No honing.
- Will not chatter.
- Chrome-like finish.
- Perfect alignment.
- Full bearing surface.
- Left and right spirals.
- 50 to 80 thousandths expansion.
- Cannot fall in slots or oil grooves.
- Extension pilots for line-up work.

WILL SHIP ON
30 DAYS' TRIAL

EVANS FLEXIBLE REAMER CORP.
4541 RAVENSWOOD AVE. • CHICAGO, ILL.

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"Rush" means VAN DORN Tools

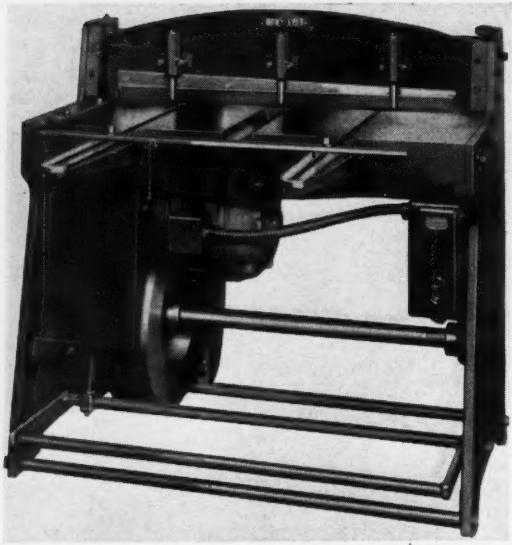


on YOUR Wartime Jobs

As you study your war-production line to get top speed in every operation, remember: Van Dorn Electric Tools give you over 100 different models for every kind of production and assembling job. Drills, grinders, sanders, shears, screw drivers, nut runners—every tool powered to the job, designed for speed hand-

ling, built tough for tough going. Your Van Dorn Jobber is a specialist in applying the right electric tool to the job. He supplies Van Dorn Tools in a hurry. He is backed by 26 Factory-owned Service Stations, coast-to-coast, for quick repairs. Call him, or write: Van Dorn Electric Tool Co., 720 Joppa Rd., Towson, Md.

"Van Dorn"
(DIV. OF BLACK & DECKER MFG. CO.)
PORTABLE ELECTRIC TOOLS



Whitney-Jensen Series No. 72 Power Squaring Shear

The crosshead of the unit is of steel construction with true support. The slide bearing at each end of the crosshead is of a cast steel V-type operating in cast iron block, and is adjustable to and from the lower blade to provide proper clearance for shearing. A backgauge is attached to the crosshead and can be arranged in a parallel position as well as at an angle in relation to the shear blades.

Standard shear blades are inlaid high carbon steel. Special shear blades or high steel blades can be furnished on order. The lower shear blade is adjusted by means of a tapered wedge located directly below the blade. By loosening the bolts on the wedge and moving the wedge endwise, the lower shear blade can be moved up or down. Both the upper and lower shear blade are held firmly to a solid mass of metal, preventing springing.

The table of the Whitney-Jensen Series No. 72 Power Squaring Shear is

with three indexing plates for dividing all numbers to 50 and even numbers to 100, excepting 96-T. The unit is available for right or left-hand mounting and has a shipping weight of 40 pounds.

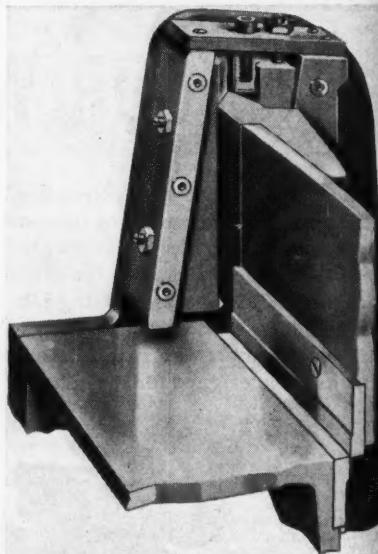
Whitney-Jensen Series No. 72 Power Squaring Shear

Illustrated herewith is the Whitney-Jensen Series No. 72 Power Squaring Shear which has been brought out by the Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill. The machine is made in 36 and 42-inch cutting lengths and 14 and 16 gauge capacities.

GEARS Good Gears Only

All Kinds
Any Quantity
AT THE RIGHT PRICE

THE CINCINNATI GEAR CO.
1825 Reading Road Cincinnati, Ohio

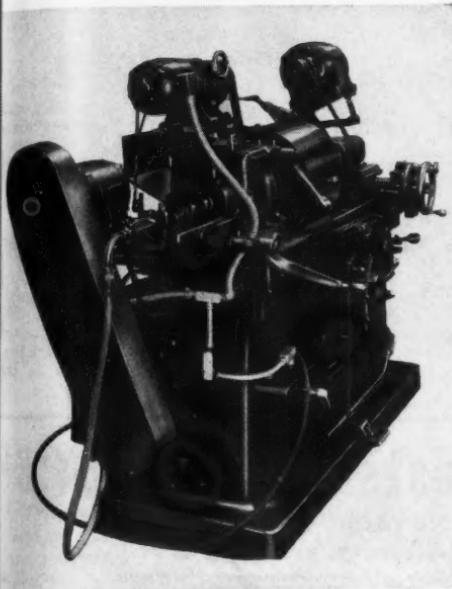


Section of Whitney-Jensen Power Squaring Shear Showing Blade Adjustment

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Put **MASTERDRIVES** on your **HEALD** Internal Grinders



MASTERDRIVES on this Heald Grinder are specially engineered for the job. Speedranger-equipped work head permits selection of exact speed for desired finish. Standard precision balanced motor on wheel head provides speed to suit the spindle. Independent pump drive if not mechanically connected. Motorized feed drive for all types of feed . . . MASTERDRIVES for all other makes of grinders are part of 550 different specifications for practically any machine tool drive requirement. Each unit is complete, easy to install, operate and maintain.

**Infinite variation in
work head speed
over 1 to 9 range—
unusual control of
finish**



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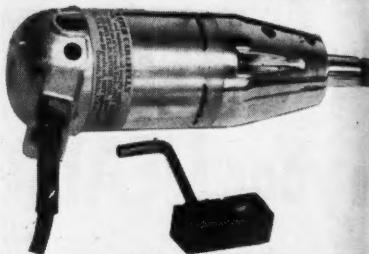
a semi-steel normalized casting which is provided with T-slots and extended arm supports for holding gages. Hold-down is the spring plunger type and is completely concealed.

Housings of the machine are steel fabricated and firmly doweled to the bed plate. Connecting rods are of steel construction with bronze bearings. Clutch is the plunger pin type.

H & H Rubber-Abrasive Polisher

H & H Research Co., 12540 12th St., Detroit, Mich., announces the addition of a rubber-abrasive polisher to its line of portable electric filing and honing tool accessories. The polisher consists of a rubber pad impregnated with abrasive which may be formed in any size up to 3 x 1 inch square and is mounted on a 2-inch offset holder for use with H & H Senior Model Reciprocating Action Portable Electric Filing and Honing Tools. The polisher is available in grits ranging from 80 up to 180 and in various shapes within the above dimensions.

The H & H Rubber-Abrasive Polisher can be used to produce and maintain a mirror-like polished finish on dies, molds,



H & H Rubber-Abrasive Polisher

and so on. Scratches produced by file which are invisible to the human eye are said to be brought out plainly and removed while producing a polished surface.

Jefferson Improved Motor-Driven "Bull Dog" Precision Milling Machine

The illustration shows the Jefferson Improved Motor-Driven "Bull Dog" Precision Milling Machine for use in the

Cut Dressing Costs with WILLEY'S



No resetting required.
Accurate, precision dressing.
For all makes of grinders.
Lower production costs.

Layer upon layer of natural, whole diamonds, in tungsten carbide matrix. Many sharp cutting points in constant contact with grinding wheel during the entire life of the tool. Make comparative tests, for quality and cost per dress-

ing. 4 standard sizes. Prompt shipment. Prices include holder. Order today! Ask for Bulletin 142, covering Willey's Standard Tungsten Carbide Cutting Tools and Torpedo Type Wheel Dressers.

No.	Usable Contents of the Diamonds		QUANTITY PRICES				Wheel Diameter
	Diameter	Length	1-25	26-50	51-75	76-100	
W-3	1/8	1/8	\$11.00	\$10.00	\$ 9.00	\$ 8.00	6 to 12
W-4	3/16	3/8	13.00	12.00	11.00	10.00	12 to 20
W-5	5/16	1/2	15.00	14.00	13.00	12.00	20 to 24
W-6	7/16	7/16	17.00	16.00	15.00	14.00	24 to 42

WILLEY'S CARBIDE TOOL CO.

1340 W. Vernor Highway.

Detroit, Michigan

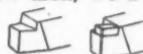


"This shipment of KENNAMETAL tools and blanks will turn 24,000 gudgeon pins for that big marine engine order."

"Harry the Works Manager couldn't believe it."

"Don't tell me, he says, you've got enough tools on that little bench to turn out 40 carloads of 5½" gudgeon pins 30" long!"

"Yes sir, I says. We know how to do it now. We grind our tools carefully every 80 pins, and we're careful to use those special loose bond grinding wheels on our wet grinders. That way, we average 10 regrinds and 800 pins to a tool. Then we cut off the end of the tool, cut a rabbet across it and braze on a new KENNAMETAL tip with silver solder. We do that three times before the shank is too short. That makes 3200 pins per tool, and to allow for breakage by new men, we bought 50% over. I showed him the way we braze on new tips like this:



"Tools made like that stick better than the ones recessed with an end mill. Fellow from the KENNAMETAL factory says one wall to position the tip against is better than a wall all around the tip, because you don't get the warping strains on the tip. Rest peaceful, Harry—we've got enough tools."

Write for the new 48-page KENNAMETAL Vest Pocket Manual.

KENNAMETAL: Invented and Manufactured in U. S. A.

MCKENNA METALS Co.
300 LLOYD AVE., LATROBE, PA.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
Exclusive of Canada and Great Britain



SOFT ABRASIVE LAPPING COMPOUNDS

Made expressly for use on
NORTON LAPPLING MACHINES

These compounds contain a carefully selected abrasive that cuts rapidly at first, then in a gradual uniform manner breaks down so that the very finest abrasive particles perform the final lapping or finishing action. The abrasive is suspended in a special grease or oil composition base that becomes an oily film under pressure of lapping, a base developed expressly for hand, plate and machine lapping. For extra lubrication this base mixes rapidly with sperm, kerosene, spindle, linseed, olive, etc. Only tests can determine oil best suited for your needs.

Grade No. 302½ Medium Coarse

- " No. 303 Medium
- " No. 303½ Medium Fine
- " No. 304 Fine
- " No. 305A } Extra Fines
- " No. 305B }

Lapped parts clean readily with solvent oils.

- No. 38-900A } special
- No. 38-900B } Chrome plate

Samples upon request.

UNITED STATES PRODUCTS CO.
728 FILBERT ST.
PITTSBURGH **PENNSYLVANIA**

diesinking, contour profiling, angular milling, jig boring, routing, and so on, of ferrous and non-ferrous metals which is announced by the Jefferson Machine Tool Co., 750 W. 4th St., Cincinnati, Ohio. Available in either floor or bench type with or without power feed, the machine is said to be easy to operate and can be adapted to both heavy and light duty work.

Improvements in the machine include



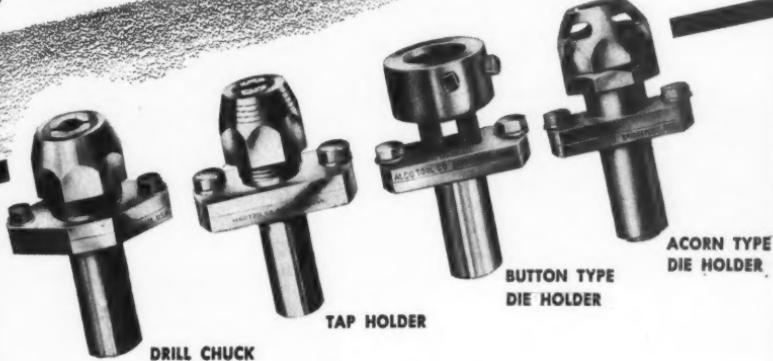
Jefferson Improved Motor-Driven "Bull Dog" Precision Milling Machine

an increase in the size of the base and pan. The spindle is mounted in tapered Timken roller bearings, and all slides are dovetailed, gibbed, and hand scraped for perfect alignment. A positive locking arrangement of table, knee and saddle is provided, and the power feed is furnished with adjustable automatic stop.

The table of the machine has a large working capacity and is equipped with three T-slots to accommodate standard T-bolts for use in clamping work or fixtures. All feed screws of the machine are minutely and accurately machine

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PUT THEM TO WORK!



FOR DEFENSE

against profitless production, eliminate slow, obsolete methods.

ALCO TOOLS make possible faster set-ups, cut out costly bushing inventories and all bushings expense.

Perfect internal or outside threads cut to meet the most rigid government specifications and held to close tolerances for the entire run.

Prompt shipments are now being made of Alco Drill Chucks, Alco Tap Holders, Alco Button Type Die Holders, and Alco Acorn Type Die Holders.

Be sure you have our latest complete catalog for quick reference. Write for list of representatives in the U. S. and England.

ALCO TOOLS

THE ALCO TOOL CO.

835 HOUSATONIC AVE., BRIDGEPORT, CONN. Detroit Office: 908 Stephenson Bldg.

threaded and have dials which are graduated in thousandths of an inch. The vertical feed screw is operated by bevel gears with a ratio of 1 to 1.

The Jefferson Improved Bull Dog Milling Machine is designed for use with a variety of standard attachments and is equipped with a silent and powerful V-belt drive. A quick adjustment lever maintains constant maximum pulling power of V-belts and automatically releases itself in case of overload. The cabinet column of the machine provides for storage of collets and attachments.

Specifications of the Jefferson Im-



Cut Set-Up Time

75% through use of the
New Advance Clamps
(the only T-slot clamps)
Clamp directly over
work. For use on all
machines with T-slots.
Standard and Heavy-
Duty type.

Write for circulars.

ADVANCE MACHINE WORKS
3727 Weisser Park Fort Wayne, Indiana

MAXI-JR.-E.

Super Sensitive Drilling Machine

Customers on sending in repeat orders tell us, "We want your machine—it's 'Tops'." You, too, will find it "tops" on your small hole drilling where accuracy is essential.

On instrument, aircraft, Diesel, and any other type of precision drilling, the Hamilton-Muehlmann Super-Sensitive Drilling Machines have a recognized superiority in precision, sensitivity, and economy.

Write for catalog.



proved Motor-Driven Bull Dog Precision Milling Machine are as follows: longitudinal feed of table, 8 inches; traverse feed, 3 inches; vertical motion to knee, 5% inches; maximum distance from center to table, 5% inches; working surface of table, 14 x 4% inches; motor, ½ h.p., 1,750 r.p.m., single phase, 110 or 220 volts, 60 cycles, a.c.; spindle speeds, 200, 400, 700, and 1,000 r.p.m.; height overall (floor type), 52 inches; weight crated, bench type, 350 lb., floor type, 500 pounds.

Hamilton "Victory" Wood Filing Unit

A filing unit of sturdy wood construction for use in filing tracings, blueprints, plans, and so on, to be known as the "Victory," is now being marketed by the Hamilton Mfg. Co., Two



Hamilton "Victory" Wood Filing Unit

Rivers, Wis. The unit is styled and finished in the same olive green as standard steel units and is made in three sizes which can be interlocked and stacked with corresponding sizes of steel units. Each size unit has five drawers.

Features of the Hamilton Victory Wood Filing Unit include locking cap which prevents unauthorized persons from reaching through top of unit; +

The BARNES Motor Driven Precision CUTTER GRINDING MACHINE

For Precision Grinding of
Formed Milling Cutters used
in the manufacture of rifles,
pistols, etc.

GENERAL MACHINERY CORP.
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Machine

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Why This New TAPPING UNIT

Produces BETTER Tapping at LOWER COST

Procurier Universal Tapping Machines give increased output, more accurate tapping and tremendously increased tap life. The features that make this possible include: 1. Four speeds, ranging from 390 to 2050 RPM. efficiently handle jobs for which conventional high speed tapping machines are inadequate. 2. One machine handles tap sizes from No. 2 to $\frac{1}{2}$ " through two interchangeable heads. 3. Extra long Spiral Compensating Springs conveniently located, with wide range hand screw adjustments, maintain pre-set tap feeding and reversing pressure INDEPENDENT OF OPERATOR.

Tap establishes its own lead!

The new Procurier Universal Tapping Machine is exclusively designed so that it actually allows the tap to establish its own lead. There is nothing more accurate than a precision ground thread tap as a guide for tapping—so maximum tapping efficiency is attained where an accurate tap is free to establish its own lead in cutting the thread.

This exclusive Procurier feature means more accurate tapping with every thread uniform, greater production with less spoiled work and less tap breakage.

SEND FOR CATALOG giving full details, description and prices on the full line of Procurier Universal Tapping Machines, hand or foot operated, the complete line of Procurier Precision Tapping Heads to meet all needs and the new Tru-Grip Tap Holder.

PROCUNIER

SAFETY CHUCK COMPANY 12 S. Clinton St., Chicago, Ill.

PROCUNIER SAFETY CHUCK COMPANY

12 S. Clinton St., Chicago, Ill.

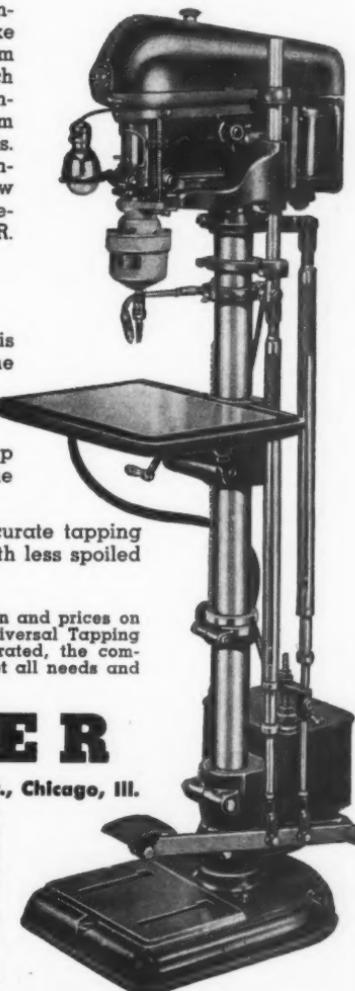
Send me bulletins on: High Speed Tapping Heads
 Tru-Grip Tap Holders Universal Tapping Machines.

Name.....

Address.....

City.....

State.....



inch flush base; Pantasote dust covers for drawers to protect filed materials from dust, and so on; roller drawer construction; safety drawer stops, and positive five-drawer locking device.

Binks No. R3-EC Cleaning Gun

Designated as the No. R3-EC, a cleaning gun for spraying various kerosene type cleaning fluids, including "Varsol."



Binks No. R3-EC Cleaning Gun

"Stanosol," and so on, has been placed on the market by the Binks Mfg. Co., 3114 Carroll Ave., Chicago, Illinois.

The gun is equipped with pistol grip, adjustable material control, adjustable

nozzle, and $\frac{1}{4}$ -inch standard pipe thread air connection. The gun is said to use approximately 4 cubic feet of air per minute at 40 to 50 lb. pressure and can be operated in connection with quartz siphon cup or with suction hose leading into open container. Net weight of gun, $1\frac{1}{2}$ lb., shipping weight, 3 pounds.

Schneible FiltreFan

A unit designed for removing dust and fly ash from flues, kilns and furnaces, smelter stacks, and cupolas, to be known as the Schneible FiltreFan, has been introduced by the Claude B. Schneible Co., 3951 Lawrence Ave., Chicago, Ill. The unit consists of a combination housing on which is mounted a rejector wheel and fan wheel. These two wheels are located on a single motor-driven shaft. Solids are removed from gas streams by means of the rejector wheel, which throws the particles into a dead zone and hopper by centrifugal force. The dust particles do not come into contact with the wheel, thus eliminating wear on the wheel blades.

Dust-laden air or gas enters the scroll of the rejector wheel through a tangential inlet. The rejector wheel is caused

Rawhide HAMMERS



• Genuine Java Water Buffalo Hide replaceable faces in malleable head.

No.	Dia. in. ins.	Wgt. in lbs.
0	1	$\frac{1}{2}$
1	$1\frac{1}{4}$	$1\frac{1}{8}$
2	$1\frac{1}{2}$	$1\frac{1}{8}$
3	$1\frac{3}{4}$	$2\frac{1}{4}$
4	2	4
5	$2\frac{3}{4}$	$5\frac{1}{2}$



• These are the tough, resilient, long-lasting Rawhide faces made from specially treated Java Water Buffalo hide for use in Chicago Rawhide Hammers.

Rawhide MALLETS

• A finely balanced Tool with tough, resilient Java Water Buffalo Rawhide heads.

Not Loaded

No.	Dis. Ins.	Lgt. Ins.	Wt. Ozs.
0	1	$2\frac{1}{8}$	2
1	$1\frac{1}{4}$	3	$3\frac{1}{2}$
2	$1\frac{1}{2}$	$3\frac{1}{4}$	6
3	$1\frac{3}{4}$	$3\frac{1}{4}$	$7\frac{1}{2}$
4	2	$3\frac{1}{2}$	10
5	$2\frac{3}{4}$	$4\frac{1}{4}$	21
6	$2\frac{3}{4}$	$4\frac{1}{4}$	23

Loaded Mallets

No.	Dis. Ins.	Lgt. Ins.	Wt. Ozs.
7	$1\frac{1}{4}$	3	8
8	$1\frac{1}{2}$	$3\frac{1}{2}$	12
9	$1\frac{1}{4}$	$3\frac{1}{2}$	16
10	2	$3\frac{1}{2}$	20
11	$2\frac{1}{4}$	$4\frac{1}{4}$	42

CHICAGO Rawhide MFG. CO.
1281 ELSTON AVE. ★ CHICAGO, ILLINOIS.



Four
ways
to

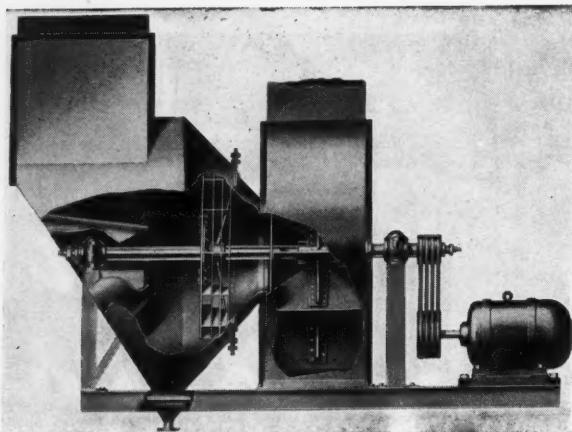
Increased production

- 1 TORQ-QUA-MATIC drives avoid losses thru belt slippage, and breakdowns associated with overhead shafting.
- 2 Convenient location of speed selector reduces operator fatigue,—increasing his production.
- 3 Delivers greater torque capacity at the output shaft than is ordinarily obtainable. Makes lazy tools work.
- 4 Permits installation of additional machinery in odd spots; adds flexibility to shop layout.

for lathes, shapers, millers, punch presses, etc.

PROMPT DELIVERY — ORDER NOW!

THE **TORQ** ELECTRIC MFG. COMPANY
6605 CARNEGIE AVENUE • CLEVELAND, OHIO



Schneible FiltreFan

to rotate by vanes, throwing the dust particles outward against the scroll, from which they travel to the discharging hopper. The cleaned air enters the periphery of the rejector wheel and is drawn toward the center between the side sheets and the vanes. Through an

outlet port in the center the air is drawn by a conventional fan wheel to be exhausted through an outlet duct.

Wheels, housings, and hopper are built of heavy steel plate. The combination housing is mounted on a single base, which includes the motor mounting. The housing is split horizontally in line with the motor-driven shaft to make the rotating assembly removable, the assembly being dynamically balanced. Anti-friction bearings and large shafting are said to prevent distortion of moving parts.

For high temperature stack gas, the FiltreFan is equipped with a hollow water-cooled shaft with packing glands

and water connections provided at both ends. If desired, jets can be placed in the refuser wheel housing. Water from these jets floods a portion of the scroll and hopper, thus protecting against abrasion and ensuring dustless removal of solids.

The Schneible FiltreFan is made in

THE MARSCHKE LINE

YOUR GRINDING COSTS

You want the fastest metal removal per hour, at the lowest possible abrasive wheel cost. These requirements call for the controlled wheel speeds and the smooth wheel rotation for which long-life Marschke Grinders are noted.

Whether you need a floor stand or a swing frame grinder...whether it be equipped with a 1 HP or a 25 HP motor...there is a quality Marschke for your particular requirements and Marschkes will do your grinding at the lowest possible cost. See the proof—write today for the Marschke Catalog, to



VONNEGUT MOULDER CORP.

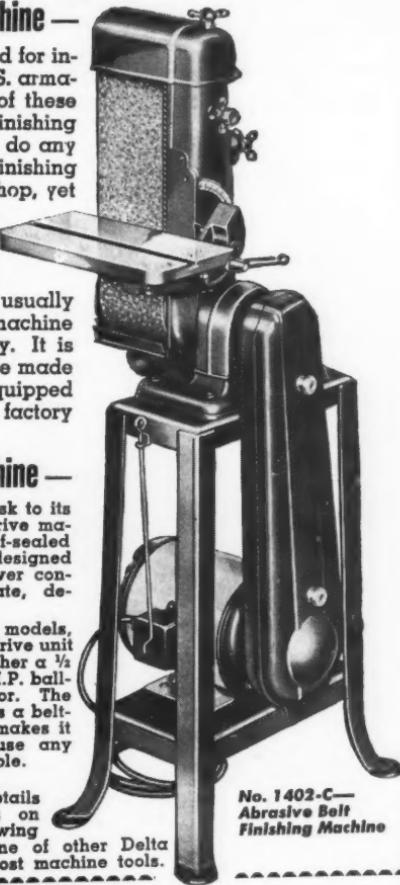
1804 Madison Ave.

Indianapolis, Ind.

RIGHT NOW ...for Armament work you can use these Abrasive Finishing Machines

★ DELTA Abrasive Belt Finishing Machine —

When you are confronted with an urgent need for increased production in connection with the U. S. armament program—check into the possibilities of these Delta machines. Here is a 6" Abrasive Belt Finishing Machine that is heavy and husky enough to do any of the dozens of sanding, polishing and finishing operations to be found around the average shop, yet which is portable enough to be used just where it is needed. It has found wide acceptance for fining, finishing and surfacing metal and plastic parts. Every feature has been designed to eliminate disadvantages usually found in small belt polishing machines. The machine may be used either vertically or horizontally. It is completely guarded, and dust removal may be made efficiently. It is completely ball-bearing equipped with double-seal bearings, lubricated at the factory for life.



★ DELTA Abrasive Disk Finishing Machine —

From its completely machined, true-running 12" disk to its surface table and the husky spindle of the belt-drive machine, carried on self-sealed ball bearings, it is designed for long life, low power consumption and accurate, dependable results.



No. 1426

Made on two models, one a direct-drive unit employing either a $\frac{1}{2}$ H.P. or a $\frac{3}{4}$ H.P. ball-bearing motor. The other model is a belt-drive which makes it possible to use any motor available.

SEND FOR CATALOG giving full details and prices on Delta Abrasive Finishing Machines—and also showing

full line of other Delta low-cost machine tools.

No. 1402-C—
Abrasive Belt
Finishing Machine

DELTA
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THE DELTA MFG. CO.

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Speed and Smoothness in cutting action — Longer Life — that's what you get when you use Chicago Mounted Wheels.

Made in all types of abrasives, grains and grades, mounted on shanks of different diameters and lengths—there is a Chicago Mounted Wheel to lick every grinding job from the most intricate cartridge dies to snagging hard-to-reach parts on tanks. For high-speed POLISHING, the sensational new Chicago Soft Rubber Mounted Wheels save hours of tedious hand work.

Illustrated is a group of wheels mounted on $\frac{1}{4}$ " diameter shanks, for use with portable and precision equipment. These are one-half actual size. Hundreds of other shapes are available on $\frac{3}{32}$ ", $\frac{1}{8}$ " and $\frac{3}{16}$ " diameter mandrels.

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That's the quick way to learn first-hand about these remarkable wheels. Tell us the kind of job, size and wheel speed you use and we'll send a test wheel postpaid.

CATALOG — Covers the complete line of Chicago Mounted Wheels and time-saving accessories for use with portable tools. Send for copy today.

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for the Multichek section. When its respective diameter is within the tolerance established by masters, the light shows amber. When the diameter is undersized, the light shows red and when oversized, it shows green. To permit rapid reading, a master Multichek signal light is located between the two indicating tubes. When the external diameter is within tolerance, this light is off. Therefore, the inspector need only look at the center of the gage proper to immediately see the condition of all diameters being checked.

The gaging spindles of both parts of the gage are located at the base and so

placed that the inspector contacts both in one pass. The Precisionaire spindle has two orifices, one for each of the internal diameters being checked. Directly to the left of this spindle is the Multichek gaging spindle.

According to the manufacturer, the Sheffield Precisionaire-Electrichek is extremely rugged, fast, and accurate and checks to fifty millionths of an inch instantaneously.

Dorman Clutch Type Tapping Attachments



Make your Drill Press convertible in two minutes to tapping work. Adjustable friction drive No. 1 TAPPER drives smallest tap in softest material to $\frac{3}{8}$ " tap in steel. Simple adjustment takes less than one minute to change from light friction to positive drive or any intermediate stage.

FLOATING CHUCK JAW automatically centers tap. No. 2 and No. 3 Tappers—Positive Drive—take up to one inch tap.

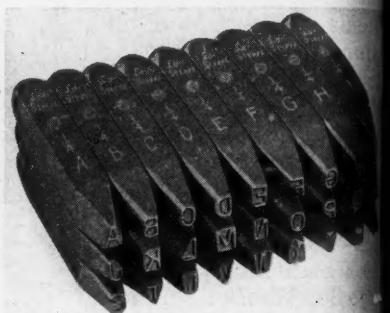
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"Lo-Stress" Steel Stamps

Known as "Lo-Stress," a line of steel stamps having round face characters designed for marking parts on which torsional or tensile stress is exerted.



"Lo-Stress" Steel Stamps

now being marketed by Jas. H. Matthews & Co., 3942 Forbes St., Pittsburgh, Pa. The stamps are also designed for marking heat-treated steel parts where internal stresses may cause breakage of parts at point of marking on surface. Due to the special character design of the stamps and the round-

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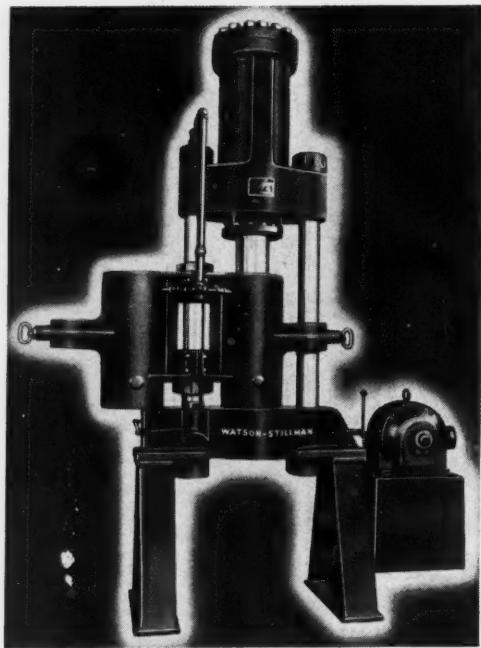
Where a spirit of National Unity prevails and a realization of the serious war situation confronting us dominates our thoughts and actions.



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Watson-Stillman 200-Ton Straining Press

Watson-Stillman 200-Ton Straining Press

Manufactured by The Watson Stillman Co., Roselle, N. J., the 200-ton hydraulic straining press illustrated herewith is designed to strain or filter fluids under a pressure of 2,000 lb. per square inch. The machine has two cylindrical containers, each 10 inches in diameter and 33 inches deep, mounted on a swinging arm so that one may be filled while the press strains material from the other.

The press, being completely self-contained, includes a 20 h.p. motor, 18 g.m.p. pump, and oil tank. The entire unit is 14 feet high, weighs 15,000 lb. and requires 5 x 3 feet of floor space. Control is by a single lever-operated valve.

The main ram has a 33-inch stroke and operates in a double-acting cylinder. Two container lifting cylinders facilitate swinging of the containers between loading and straining operations.

ed impression produced by them, parts are said to be permanently marked in such a manner that a minimum stress will be set up on parts at point of marking when in use.

Lo-Stress Steel Stamps are designed for the safe marking of aircraft, tubular, or heat-treated parts and are available in letter and figure stamps and hand stamps. Stamping and roller dies as well as steel type for use in type holders are also available with Lo-Stress characters.

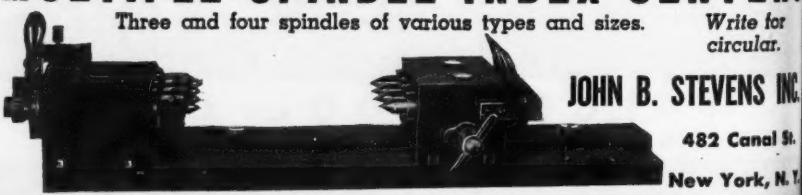
8-Inch Stroke Hy-Duty Shape-Rite Shaper with Swivel Table

An 8-inch stroke Hy-Duty Shape-Rite Shaper with swivel table for use in the manufacture of gun parts, all types of gages, and so on, has been brought out by the Sales Service & Mfg. Co., 473 Cleveland Ave., St. Paul, Minn. The

THIRTY YEARS EXPERIENCE MANUFACTURING MULTIPLE SPINDLE INDEX CENTERS

Three and four spindles of various types and sizes.

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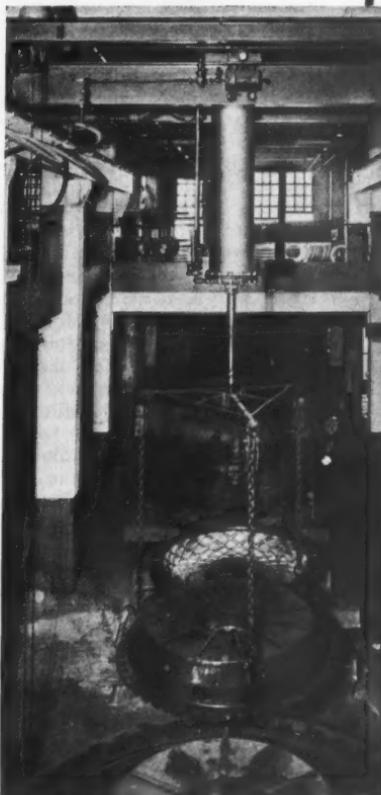
Solves a Production Problem with a **CURTIS** **AIR HOIST**

Goodyear solved the problem of handling heavy tire molds and heater lids with a Curtis Air Hoist. Loads average 30,000 pounds with a maximum of 40,000 pounds per operation. Since the installation of this Curtis Air Hoist, no maintenance has been necessary.

Curtis Air Hoists Assure:

- Low first cost — low operating expense
- Smooth, fast, accurate control of loads
- Light weight—available in pendant, bracketed, and rope compounded types
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- Fewer production interruptions for servicing
- One man operation — by ordinary labor

If production in your plant includes the hoisting of equipment or materials, it is more than likely that Curtis Air Hoists will speed up your work, release labor for other jobs, and lower production costs at the same time. Write for free booklet, "How Air Is Being Used in Your Industry."



Curtis Pneumatic Machinery Division of Curtis Mfg. Co.
1913 Kienlen Avenue, St. Louis, Missouri

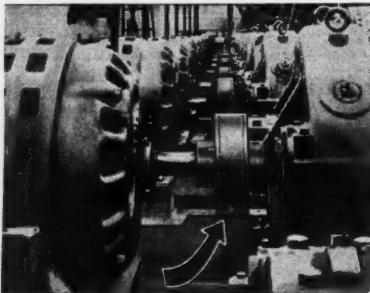


RUSH REPAIR JOBS --- A WAY TO AVOID THEM

The loss you would suffer in output by being forced to shut down a Productive Machine for repairs would probably be greater today than at any time in your history—why not guard against such shutdowns by using KANTI-LEVER COUPLINGS? They have a Cushion Torque that protects your Productive Machines, your Gears, Motors, Speed Reducers, Bearings, etc., by absorbing the constant vibration and sudden load shock that cause gradual deterioration and finally shutdowns and rush repairs. They likewise protect you against the evils of shaft misalignment the same as does the ordinary Flexible Coupling. The cut below shows 70 KANTI-LEVERS that have run for 18 years and during that time have paid back their first cost many times over by reduction of repair bills and prevention of shutdowns.

Send for Bulletin 28-M describing

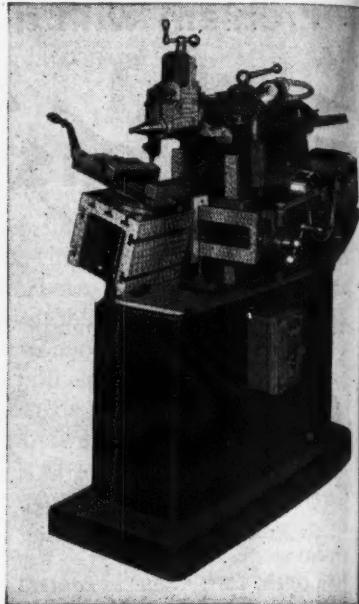
KANTI-LEVER COUPLINGS



BROWN
ENGINEERING CO. 120 N. THIRD ST.
READING, PA.

swivel table is mounted on a spec heavy duty cross rail saddle and is graduated to 90 deg. at either angle or total of 180 deg., thus enabling it to very easily set to any desired angle.

The Hy-Duty Shape-Rite Shaper provided with a special cast iron bed. All gears of the machine are mounted on anti-friction bearings and are easily lubricated by means of a special hub.



8-Inch Stroke Hy-Duty Shape-Rite Shaper with Swivel Table

cating system which is located on the outside of the shaper. All gears are the helical angle type, stub toothed to ensure smooth running and to eliminate tool marks.

Jeffrey Metal Turnings Crusher

The Jeffrey Mfg. Co., Columbus, Ohio, is now marketing the metal turning crusher shown in the accompanying illustration for use in plants of various types, scrap metal yards, and so on. The machine has a low frame of heavy plate welded steel and is equipped with a renewable manganese steel liner, high grade self-aligning roller bearings, and

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angle.
Shaper
iron bar
mounts
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Announcing the **TEMP-A-TROL*** **FORGE WELDER**

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"The machine
that thinks
for itself"



WHAT IT DOES:

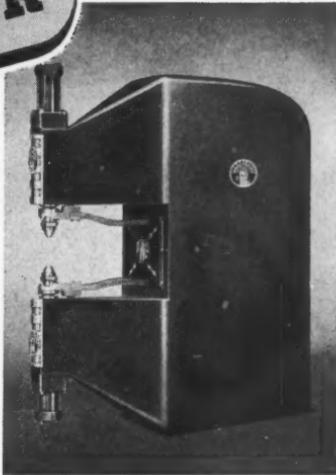
1. Welds
2. Heat-treats
3. Controls: Ductility, grain refinement, homogenization. Avoids annealing of hardened surface.
4. Eliminates the human element in selecting weld and heat-treat cycles, etc.

DESIGNED FOR:

1. Resistance welding of heavy sections, and of
2. Special alloy steels, such as homogeneous and face-hardened armor plate, etc.

HOW IT DOES IT:

1. Temperature AT the weld itself controls weld and heat-treat cycles—automatically.
2. Merely set dials for weld and heat-treat temperatures desired. Machine is self-compensating for all such variations as normal differences in metal thickness, induction and short-circuiting losses, presence of scale, etc.

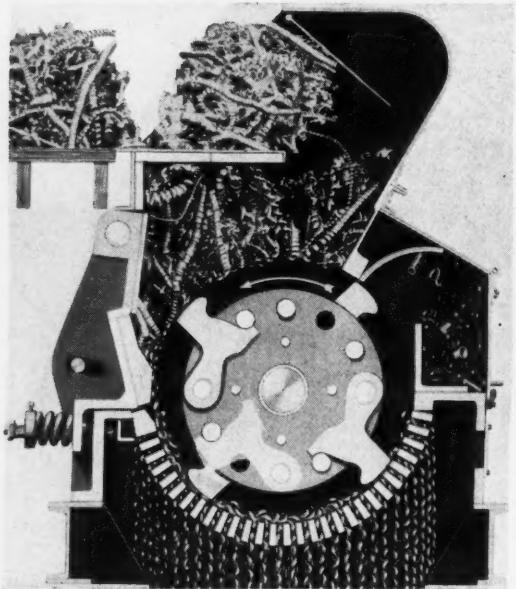


Information on the new process will be furnished at present only to organizations engaged in or contracted to engage in war production work. Please address all inquiries direct to:

PROGRESSIVE WELDER CO.

50 EAST OUTER DRIVE

DETROIT, MICHIGAN



rectangular cross-section screen bars of high carbon steel, riveted in sections. The machine can be furnished with heavy flywheel pulley for belt drive or flexible coupling and balance wheel for direct connection to motor. A structural steel sub-base can be supplied for unit mounting of crusher and motor.

Hinged doors at the back of the machine provide easy access to interior, working parts, and metal catcher. Doors are held closed tightly with T-headed bolts and latches, anchored to machine to prevent loss.

Either a top feed or side feed hopper can be furnished for hand feeding of turnings, both types being equipped

with a safety flap gate. If conveyor feed is desired or conveyor is to be used in carrying the crushed turnings storage, the machine can be furnished with the proper type of equipment to meet such requirements.

In use, steel turnings are fed by hand through feed hopper. In passing through the crusher the turnings first come in contact with revolving crushing elements, the heavy ends which reduce the turnings impact. The turnings are then further reduced by passing through screen bars in the bottom of the crusher. Spacing of the screen bars determines the degree of fineness of product. Turnings can be reduced to short lengths to facilitate hand shoveling or to a fineness required in the making of briquettes.

In operation, the crushing elements maintain their crushing position by centrifugal force but are free to swing back when coming into contact with "tramp metal" which may be accidentally fed into the crusher, thus protecting the machine from damage. The hinged breaker plate is cushioned with springs to absorb unusual shock and a further protection to crusher. A built-in metal catcher is provided to catch the tramp metal, which may be readily removed periodically.

Standard equipment of the Jeffrey Metal Turnings Crusher includes "Teeth" crushing elements, which are made of steel with crushing surfaces coated with wear-resisting metal "Clover-leaf" Rotary Ring crushing

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PROVIDE AN EASY, ECONOMICAL WAY TO RID MACHINERY AND EQUIPMENT OF DUST AND DIRT. DON'T LET DANGEROUS DUST AND DIRT SLOW DOWN YOUR VICTORY PRODUCTION. SOLD ON PRIORITIES ONLY.

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Scientifically Controlled Manufacture assures unsurpassed serviceability

• Complete laboratory and metallurgical control over charging ratios, and melting and pouring temperatures—the use in manufacture of virgin metals only thus holding impurities to negligible limits—and rigid inspection, assure at Buckeye, the production of an exceedingly high quality product.

Buckeye bearings are free from porosity or blow holes. The component metals are evenly and thoroughly dispersed to all parts of the bearings, assuring a maximum of long satisfactory service.

Buckeye bearings, reflecting the advantage of this skilful, painstaking, experienced manufacture include 1088 stock sizes of fully finished ready-to-use phospher bronze bearings—560 sizes of cored and solid, rough and finished maintenance bars in the 13" length—Graphited bearings—and "Specials" in a wide variety of IDs, ODs and lengths to customers' blueprint, slotted, split, drilled or threaded, with or without lugs, flanges, collars, etc., to meet widely different requirements. No order is too big or too small for Buckeye.

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BRONZE SLEEVE BEARINGS • STANDARD SIZES OR TO CUSTOMERS' BLUEPRINT

IN ANY RECOGNIZED BEARING METAL ANALYSIS



Industrial All-American "Vibra-test" Vibration Testing Machine

elements of manganese steel may be supplied if desired. Either type of crushing element can be readily replaced when worn without disturbing feed connection to crusher.

Industrial All-American "Vibra-test" Vibration Testing Machine

A machine especially designed for testing the vibration of parts used in

the manufacture of various types of airplanes, to be known as the Industrial All American "Vibra-test" now being marketed by Industrial Engineering Co. Inc., 141 W. Jackson Blvd., Chicago, Ill. The machine, which

readily portable, can be used for testing parts, gages, switches, instruments and so on, up to 10 lb. in weight.

The machine is provided with a speed which is adjustable, while operating from 10 cycles per second or 600 vibrations per minute to 60 cycles per second or 3,600 vibrations per minute. The machine has a displacement, adjustable while stopped, from 0 to 0.250 inch.

The motor of the Vibra-test is a 1/2 h.p., 60 cycle, split phase unit designed for operation on 110-volt alternating

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extra

**POWER AND RIGIDITY
TO SPEED
OUR OFFENSE PROGRAM**

**NEW 3 S CINCINNATI ACME
UNIVERSAL TURRET LATHE**

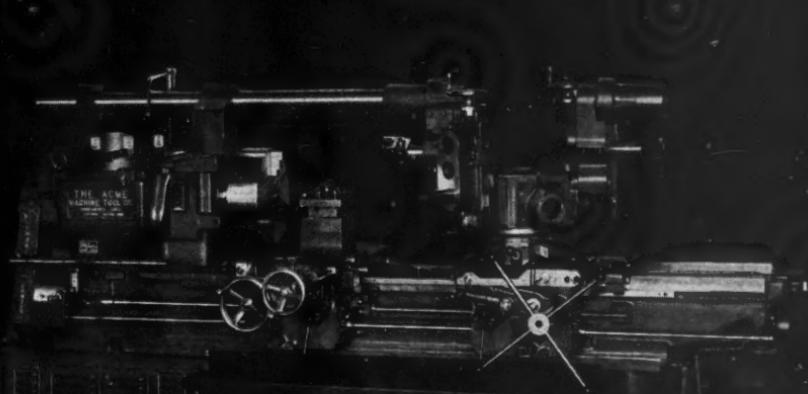
The use of carbide and other high production tools in our offense program has created a demand for a powerful and rigid turret lathe with a wide range of feeds and speeds.

This CINCINNATI ACME features a stationary overhead pilot bar which rigidly supports cutting tools and increases accuracy.

Built in 24" and 28" swing with 4 1/2" diameter round bar capacity.

Write for Details

THE ACME MACHINE TOOL CO.
CINCINNATI, OHIO

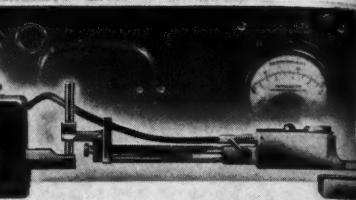


current only. The complete machine weighs approximately 40 lb., and the base is drilled for bolting to table.

Physicists Type "V" Mototrace

A newly designed Mototrace, an accessory used with Physicists Profilometers for mechanical tracing of surface finish, is announced by the Physicists Research Co., 343 S. Main St., Ann Arbor, Mich. The Mototrace, which is designated as the Type "V," is said to include a number of features not found in the Type "U" formerly manufactured.

The original unit was mechanically operated by a cam and toggle acting on a rack. This method of operation has been eliminated through the use of a 9-watt reversed driving motor, by which a length of stroke from $\frac{1}{4}$ to $2\frac{1}{2}$ inches can be obtained. Besides a long available trace, the former "dead spot" from $\frac{1}{8}$ to $\frac{3}{8}$ inch is said to be eliminated.



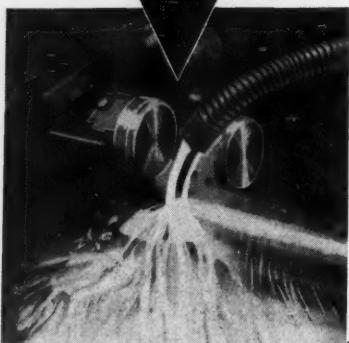
Physicists Type "V" Mototrace

nated, thereby permitting continuous adjustable settings. Provisions have been made so that if the motor becomes locked it will not heat up and thus result in damage.

The Type "V" Mototrace, which is shown in use with a Physicists Type I (internal) Tracer and Profilometer, is also said to have fewer controls than the previous model. All operations are now controlled by means of power switch and two adjustable stops.

According to the manufacturer, the Mototrace is especially useful for obtaining accurate readings on very fine surfaces. By means of the unit, the profilometer tracer can be drawn without vibration across the piece being measured. The Mototrace is also suitable

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COOLANT
SUPPLY
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means there's a
PIONEER PUMP
back of it all

When the functioning of a coolant or lubricant pump is absolutely dependable—as in the case of Pioneer Pumps—operators can concentrate more on the actual work they are doing—and manufacturers can feel confident that production is continuing uninterruptedly without waste of time and materials, or damage to material and machinery. If you want to be sure that your coolant is "there" when you want it, have Pioneer Pumps on your machines.

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DESIGNED FOR YOUR SHOP

THE WILDER PROJECTOR.

The Wilder Projector enables you to see exactly where tools, tem-
plets, gages, threads, etc. vary
from specified dimensions and contours, and how
much they are out. Magnifications available from 10x
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accurate within .000008" is a necessity to provide the
basic standard of measurements, from which all pro-
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large and small sets of our Ultra-Chex lines to suit all
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Note also Adjustable Snap Gages.

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Gives accurate dependable readings in 1/10000".
Gage blocks, plug gages, tools are checked for size,
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OPTICAL PARALLELS.

Required to inspect the surfaces of gage blocks,
lapped surfaces of all kinds and parallelism of mi-
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2 Parallels, $\frac{1}{4}$ turn of micrometer screw.....\$25.00
Set of 4 one-half inch thick.....\$85.00
Set of 4 about one inch thick.....\$90.00

SET OF REED PRECISION MICROMETERS.

1" and 2" in 1/10000", 3, 4, 5 and 6" in 1/1000".
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With three dimensional vision reveals scratches, sur-
face finish, imperfections, which cannot be seen with
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PRICE.....\$153.50
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Safeguard your production from the scrap pile

Quick production is not your only problem.
Machine tools may be speeded up, hours
saved by better set-ups, over-time and extra
shifts may be installed. Yet this will be of
no avail or benefit if the accuracy of your
product is lost with your material ending
on the scrap heap. The best investment for
any shop is in inspection tools to detect
and eliminate the errors at the source be-
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Give your men the right tools to measure
with. Remember that whether you manufac-
ture to close tolerances of "tenths" or to
wide tolerances of plus or minus .002", you
must still start with the basic accuracy in
tenths of thousandths or else your work
will not interchange with that produced in
other shops.

Invest in the Scherr Limited Budget Inspection
Laboratory to guard against future
rejections, disputes and loss of time, labor
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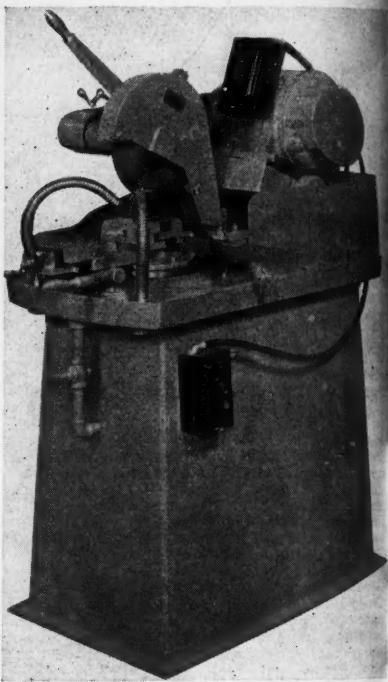
**Used on Metals, Plastics,
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Rubber, and All Materials**

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to be useful for measuring soft materials, awkward shapes, distances as short as $\frac{1}{8}$ inch, and surfaces such as those in small holes, adjacent to shoulders or bosses, and on gear and hob teeth.

Radiac Type N Abrasive Wet Cut-Off Machine

The Radiac Type N Abrasive Wet Cut-Off Machine shown herewith, product of A. P. de Sanno & Son, Inc., 440 Wheatland St., Phoenixville, Pa., is a sturdy



Radiac Type N Abrasive Wet Cut-Off Machine

well balanced machine for accurately cutting off bars, tubing, and formed shapes. Cuts made by the machine are clean and smooth and are said to seldom require any additional finishing. Coolant is directed onto the wheel and work at the point of cutting, thus increasing wheel life and reducing cutting heat to a minimum.

Sturdy construction, precision machining, and proper balancing of all moving



FOR ALL
*Sensitive
Drilling*

• The No. 2 Footbur Sipp with back gear unit is a full range sensitive drilling machine with correct speeds for all types of work.

All eight speeds are obtained on belt drive machines or on motor drive machines with standard single speed motor—no special motors are needed. The simple design provides wide speed range at the lowest cost.

THE FOOTE-BURT COMPANY
CLEVELAND, OHIO

Detroit Office: 4-253 General Motors Building

FOOTBURT

*Sensitive
DRILLING MACHINES*

parts are said to eliminate all vibration in the machine, thereby resulting in efficient operation. The machine is available with types of hand-operated vises—a straight vise for straight cuts only or a swivel vise for straight or angle cuts up to 45 degrees.

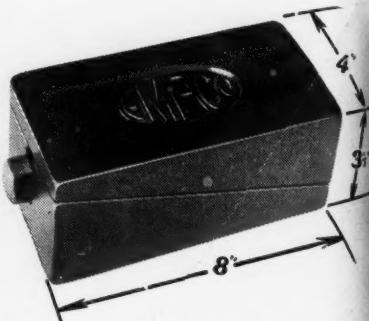
According to the manufacturer, the Radiac Type N Abrasive Wet Cut-Off Machine can be operated with stubs of abrasive discs from larger Radiac or other cut-off machines. The operating handle of the machine is said to be of a non-tiring type.

Empco Leveling Jack

A line of Empco Jacks for use in the easy and accurate leveling of machine tools, industrial furnaces, large surface plates, large assembly fixtures, and so on, is now being manufactured by Enterprise Machine Parts Corp., 2733 Jerome Ave., Detroit, Michigan.

As shown in the accompanying illustration, the Empco Leveling Jack consists essentially of two iron castings having inclined planes, the lower casting being provided with a slot in one end and a shouldered screw, the head

of which bears directly against the slot. A shoulder ring is machined on the shank of the screw and rides against

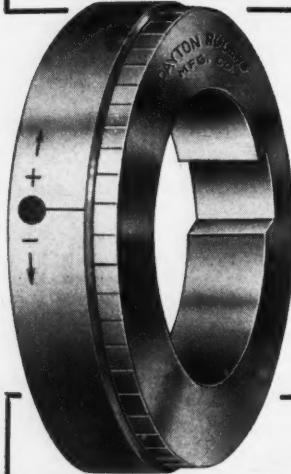


Empco Leveling Jack

the inner face of the slot. The end of the screw is threaded into the upper casting of the jack.

To operate the Empco Leveling Jack the screw of the unit is simply propelled, which action causes the inclined plane of the upper casting to move over

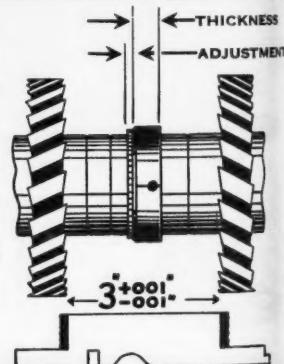
ACCURATE SPACING of Milling Machine Gang Cutters with DAYTON ROGERS Micrometer Adjustable Spacing Collars



Designed for accurate spacing of side milling cutters, gang milling and other multiple milling set-ups.

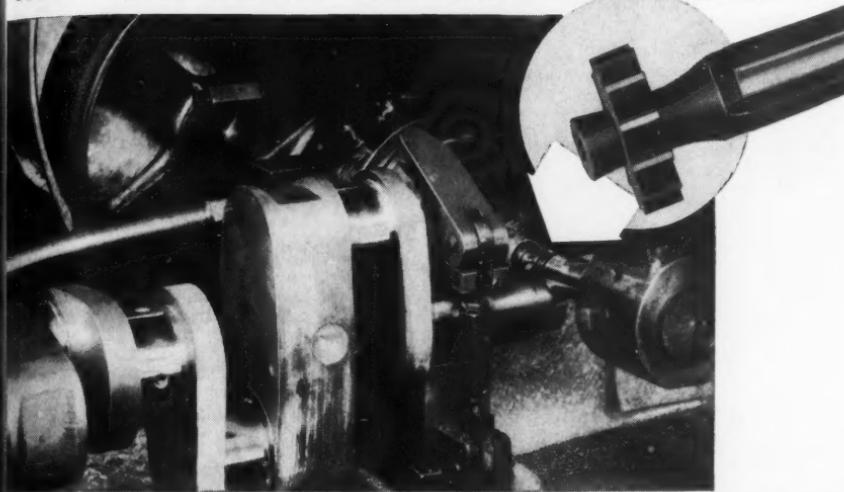
Collar may be adjusted by thousandths by merely loosening cutter arbor nut. Also quarter - thousandths adjustments.

Write for details.



DAYTON ROGERS MFG. CO.
2830 13th Ave., S. Minneapolis, Minn.

You can take heavier cuts at Faster Speeds with MIDWEST KEYWAY CUTTERS...



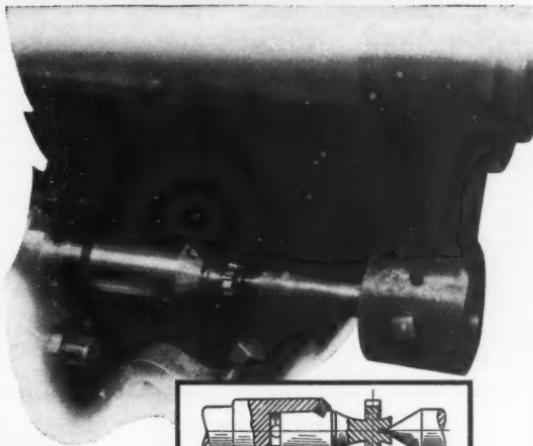
Here are **3** important reasons *why*—

1—SUPPORTED AT BOTH ENDS—the cutter is made with an extended center which provides a support for it at the outer end, thus both ends of the cutter are supported, giving absolute rigidity to the operation.

2—THE POSITIVE DRIVE—Midwest Cutters have a stub taper shank with a groove to fit a pin that is partly embedded in the wall of Midwest patented Taper and Pin Drive Holders. Full driving energy is exerted along the entire length of the shank, giving the cutter absolute rigidity and perfect alignment. No parts easily dislocated or lost are employed.

3—SCREW LOCKED—the cutter shank is designed for positive locking to the holder by a lock-screw which bears against the angular flat on the shank of the cutter. Cutter vibration is eliminated.

MIDWEST TOOL & MFG. CO.
2366 W. Jefferson Ave. • Detroit, Mich.



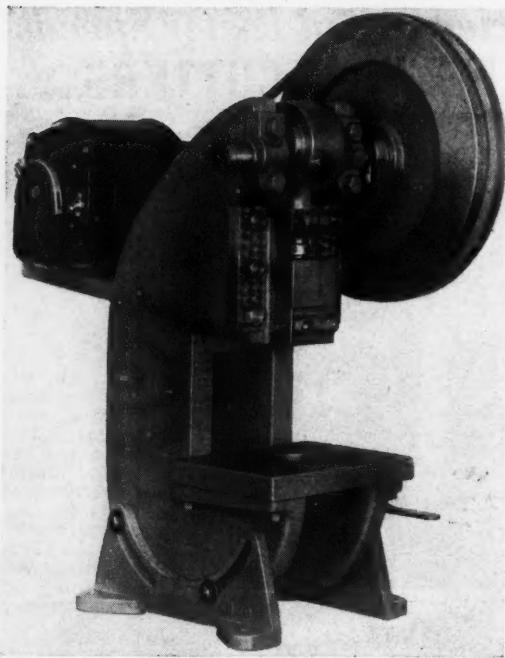
This sectional view of a Midwest Keyway Cutter set-up shows the Extended Center which provides an outer support for the cutter; the Taper and Pin Drive; and the Screw-Lock between the cutter shank and holder.



END MILLS • SLEEVES • COUNTERBORES • DRILLS • SPECIAL TOOLS
REAMERS • FORM TOOLS • CARBIDE TIPPED TOOLS • ADJUSTABLE HOLDERS



Precision METAL CUTTING TOOLS



Duro Punch Press

shown herewith is now being offered by the Duro Mfg. Co., 800 E. 61st St., Los Angeles, Cal. The press is available in 1 and 4-ton models.

An exclusive feature claimed for the press is a heat-treated alloy steel driving shaft which is absolutely straight and of the same size throughout, thus eliminating danger of shearing or twisting. Directional change or punch force is transmitted by a unique eccentric, press fit onto the driving shaft and held firmly by keys. The eccentric operates in a heavy bronze bearing. The ram or punch of the press rides for lubricant distribution and adjustable for wear.

The 4-ton Duro Punch Press is designed to accommodate dies up to $4\frac{1}{4}$ inches and has a standard stroke of 1 inch. The width of the press is 11 inches, height 25 inches, depth 15 inches, and weight 180 lb. The 1-ton press is designed for use with dies up to $3\frac{3}{4}$ inches and has a standard stroke of $\frac{3}{4}$ inch. Width of press 8 inches, height 17 inches, depth 10 inches, weight 60 pounds.

that of the lower casting, thereby raising or lowering the base of the machine under which the jack is placed, depending upon the direction in which the screw is propelled.

Duro Punch Press

Equipped with bronze bearings at all wear points to assure long life at top production speeds, the punch press

Aero Offset Rivet Sets

A line of rivet sets having angular offsets of $7\frac{1}{2}$, 10, and 15 deg. is announced by the Aero Tool Co., Burbank, Cal. In manufacturing, the tools are

HINGES
VARIOUS WIDTHS
and GAUGES

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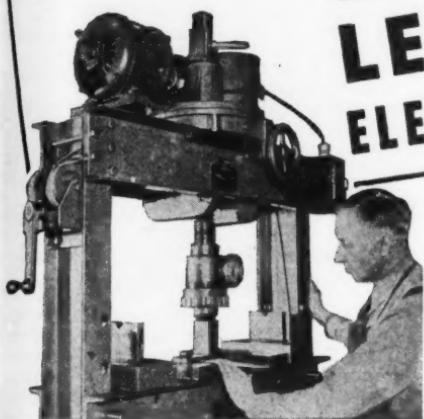
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190

FROM 0 TO 50 TONS IN 3 SECONDS

ON THIS

LEMPCO ELECTRIC PRESS

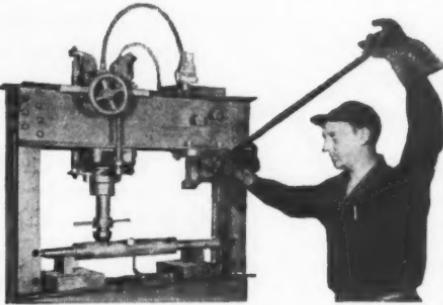


● That's speed! And the unusually rigid frame construction makes this press *safe*, too. There's nothing like it for straightening, bending, upsetting and flattening. On these and similar jobs within its capacity, the LEMPCO Electric Press does the work faster and safer than bigger machines that cost much more. 40 and 60 ton models. Good delivery. Use coupon to get full details.

40 TON AND 60 TON LEMPCO HYDRAULIC PRESSES

● Both have two pumping speeds, for high-pressure and low-pressure work. Many advanced features of design that give the utmost in speed and economy of operation. Available for prompt shipment. Use coupon below for full information.

LEMPCO Electric and Hydraulic Presses are used in the biggest shops from Coast to Coast . . . Boeing Aircraft, Curtiss-Wright, Pratt & Whitney, General Electric, etc.



PROMPT DELIVERY
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For Illustrated Circular

LEMPCO PRODUCTS, INC.
BEDFORD, OHIO

PRECISION TOOLS . . . OUR 24th YEAR

Send full details and prices on
 Electric Hydraulic Presses.

Name

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Address

City State

FACTORY REPRESENTATIVES
IN EVERY PRINCIPAL CITY

put through a process known as "Micro-glass polishing," which is said to develop a glass-smooth face that will not



Aero Offset Rivet Sets

harm aircraft skins or other surfaces the tools contact. Also incorporated in the manufacture of the rivet sets is a cup-forging process which is said to assure an even metal flow and structure for long life and extreme precision.

"Motor Mica" Transparent Pressure Grease

"Motor Mica" transparent Pressure Grease, a lubricant manufactured from high grade materials and compounded with "Motor Mica" Anti-Friction Compound, is now being offered by Scientific Lubricants Co., 3462 N. Clark St., Chicago, Ill. The grease is especially recommended for pressure systems.

According to the manufacturer, Motor Mica Transparent Pressure Grease has a melting point of 292 deg. F., is in a workable condition at a temperature of zero, and is of a No. 2½ consistency. The grease is supplied packed in 25, 50 and 100-lb. steel kits.

Lincoln "Pile Driver" Forced-Induction Pump

The Lincoln Engineering Co., 5701 Natural Bridge Ave., St. Louis, Mo., is now manufacturing a unique forced-induction pump to be known as the "Pile Driver." The pump is designed to dispense heavy viscous materials such as sealing compounds, sound deadeners, insulating materials, putty, heavy lubricants, and simi-

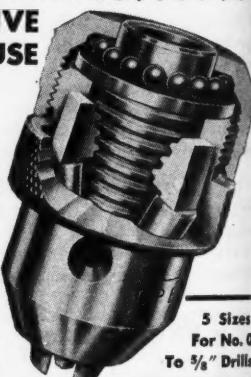
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KEYLESS
DRILL CHUCKS

Tightening drill chucks with keys is a non-productive operation—and uses up more time and energy in a day's drilling than you probably realize. Ettco-Emrick KEYLESS Drill Chucks eliminate this operation and speed up drilling. What's more, Ettco-Emrick Drill Chucks never say "uncle." Their top-notch quality and rugged construction assure trouble-free service all day and every day. Also stocked to fit all makes of portable drills.

BULLETIN No. 6 gives full details of the design and construction that makes drilling action do the tightening. Also includes prices. Write for a copy—today.



5 Sizes
For No. 0
To $\frac{5}{8}$ Drills

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598 Johnson Ave., Brooklyn, N. Y.

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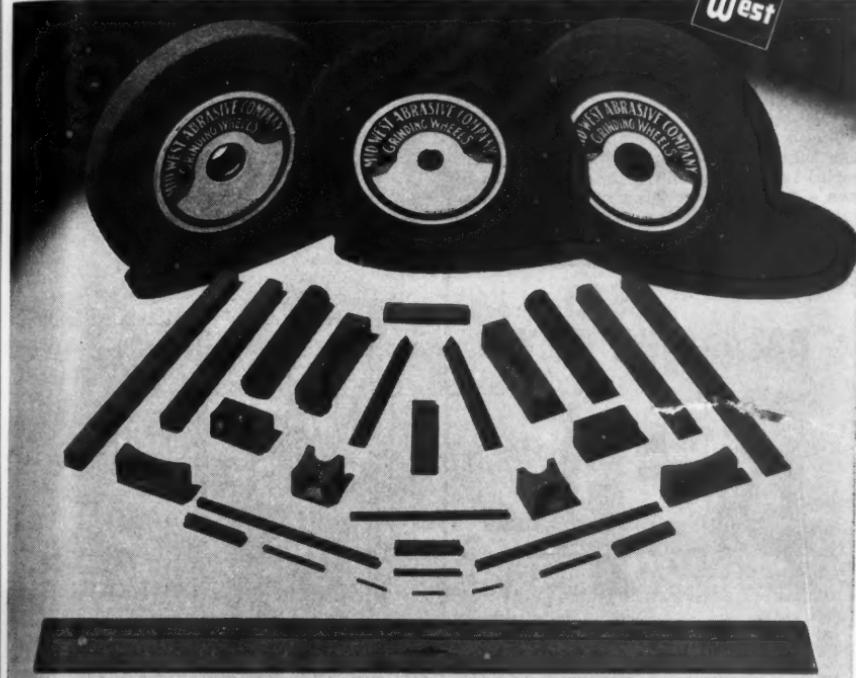
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OF **Ettco-Emrick** DRILL CHUCKS • TAP CHUCKS • TAPPING ATTACHMENTS
MULTIPLE TAPPING AND DRILLING HEADS • TAPPING MACHINES

"EFFECTIVITY"



..



You won't find "effectivity" in your dictionary but you will find lots of it in MID-WEST honing stones and grinding wheels because we coined the word to describe the longer, more effective wearing quality that has made MID-WEST products the most efficient abrasives in America.

MID-WEST honing and Superfinishing stones, in actual production, have established new records for efficiency, service and economy and all three of those factors are derivatives of "effectivity." MID-WEST

stones have longer "effectivity" because they wear down evenly, don't chip along the edges and generate as much as 90 per cent less heat than do ordinary abrasives. These high quality stones, made with remarkable new Micro Bond and designed for precision work, are produced under a precision process during which the grain structure, hardness, size, shape and balance are CONTROLLED to the final degree. Why not let a MID-WEST engineer help you solve your honing problems? Samples shipped from stock immediately.

MID-WEST ABRASIVE COMPANY

Manufacturers of grinding wheels, sandpaper and emery cloth

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DETROIT, MICHIGAN

MID-WEST ABRASIVES

lar substances.

The Pile Driver, which employs a Lincoln air motor, can be furnished in two sizes—the "100" for pumping material from containers up to 10-gallon (100-lb.) capacity and the "400" for pumping material from 55-gallon (400-lb.) drums. Each can be arranged as a single or a two-stage unit, depending upon the requirements.

The single-stage unit is designed for use where pulsation in the flow of material is permissible. The two-stage unit has a pulsation eliminator which is said to stop the pulsating effect and deliver

the extruded material at an even rate of flow and in uniform size and shape, as desired. The delivery of material in both

IMPROVED BALANCING WAYS



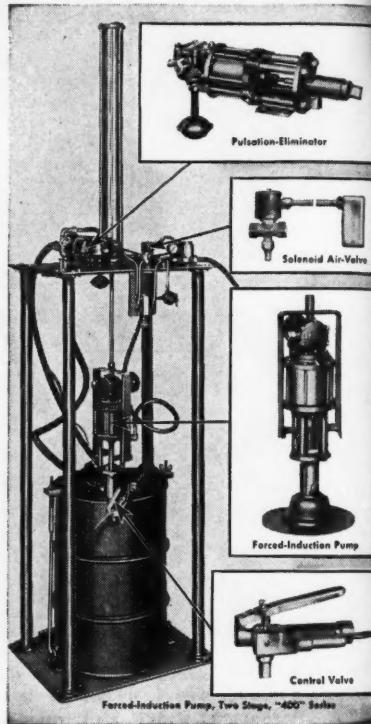
Four chilled iron discs rotate on special sensitive bearings. For balancing, straightening and trueing. Write for details.

Swing	20"	40"	60"	72"	96"
Greatest Distance Between Standards					
Capacity in lbs.	1,000	2,000	2,000	5,000	10,000

ANDERSON BROS. MFG. CO.

1926 Kishwaukee St.

Rockford, Ill.



Lincoln "Pile Driver" Forced-Induction Pump

models is controlled by a hand-operated shut-off valve at the outlet.



"SKINS" SOLID OR STRANDED WIRE

The SPEEDEX Wire Stripper "skins" and cuts solid or stranded wire from No. 12 through No. 20.

Simply place wire in SPEEDEX jaws and squeeze handle! Wire is stripped quickly, smoothly and cleanly . . . no pulling.

→ \$3.35 Complete. Order one on trial. ←

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AVAILABLE FOR WAR PLANTS



New facilities and expansion of output makes reasonable deliveries possible now to essential war plants on these vital inspection devices.

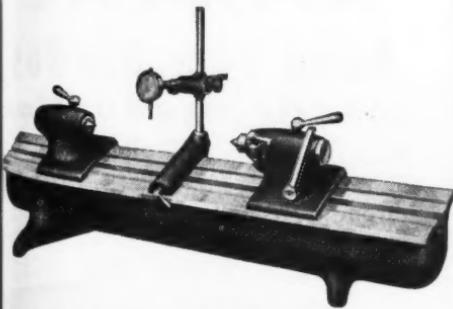
Write or wire for details

THE AMERICAN GAUGE CO.

125 Bayard St.

Dayton, Ohio

Designers and Builders of Tools, Dies,
Gauges and Checking Devices since 1919



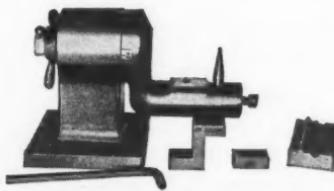
AMERICAN BENCH CENTER

Improved design. Three sizes: 4"x10"; 6"x24" and 8"x36". Inclined bed to better facilitate removal of work. Box type construction, precision scraped. Ruggedly built for either inspection or production work.



AMERICAN THREAD CHECKER

Recommended and used by leading manufacturers of thread grinding equipment for accurately checking threads on pitch line to one ten-thousandths. Capacity up to 5 in. diameters.



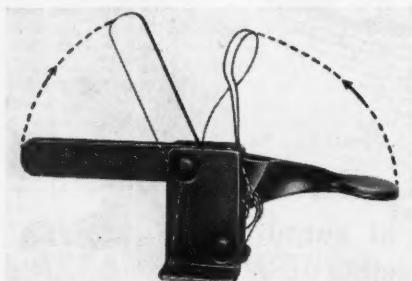
UNIVERSAL RADIUS DRESSER

Dresses surface grinding wheels to either convex or concave radii to quarter-tenth accuracy. Will improve the radii on your gauges, grinding formers, form tools, punches and dies.

De-Sta-Co Model No. 205 Toggle Clamp

To meet aircraft demands for a small size, horizontal type toggle clamp, the Detroit Stamping Co., 349 Midland Ave., De-

The handle and arm are in horizontal position when clamp is locked, thus providing clear working space above. The clamp is said to be of rigid structure and always free and easy acting. Weight of clamp, 3½ ounces.



De-Sta-Co Model No. 205 Toggle Clamp

troit, Mich., has added the Model No. 205 illustrated herewith to its line of De-Sta-Co clamps.

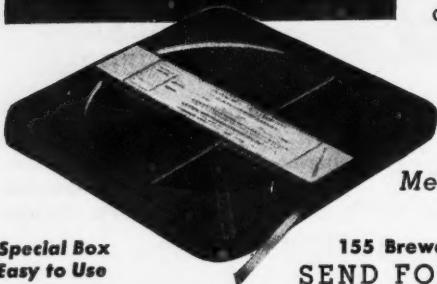
When locked in position, the clamp measures only 1½ inches high and 8½ inches from tip of handle to tip of arm.

"Penciltex" Pencil Tracing Cloth

Tuned to wartime necessity, a pencil tracing cloth has been developed which is intended to enable draftsmen to turn out more work in a given amount of time. Known as "Penciltex," the processed velvety surface of the tracing cloth is said to take the pencil perfectly. Because of the high degree of transparency and the texture that results in ink-like density from hard pencil, the cloth is said to produce sharp, major-contrast blue prints from pencil tracings.

Penciltex is said to be an anti-smudge cloth which permits the use of a 5H or harder pencil to produce the same dense line as a 2H or 3H on ordinary tracing cloth. The cloth is said to be tough, durable, and it is said that it will not discolor with age. It also erases cleanly. The cloth is available

★ CONTOUR CUTTING with ATLANTIC Band Saw Blades speeds production



Special Box
Easy to Use

Atlantic Metal Cutting Band Saw Blades have been developed through twenty years of research and specialization.

**ATLANTIC
SAW MFG. CO.**

Metal Cutting Band Saws
Exclusively

155 Brewery St., New Haven, Conn.
SEND FOR FREE BOOKLET





Illustrated above is the heat treating department of a large manufacturer of Bomb Tail Fuses. The equipment consists of one Johnson No. 820 Drawing and Tempering Furnace; one Johnson No. 130-LT Hardening Furnace for Manganese Moly Steel; one Johnson No. 130 High Speed Steel Hardening Furnace and one Johnson No. 550 Liquid Hardening Furnace with Standard Hood.

The Job Can Be Done Faster—Using Less Gas When You Install Johnson Units

All Johnson Furnaces reach maximum temperatures in less than 30 minutes—often cutting as much as 2½ hours from production time. They save up to 50% on gas consumption, over ordinary units. The compact, sturdy construction saves much valuable floor space.

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JOHNSON GAS APPLIANCE CO.
562 E Ave. N.W., Cedar Rapids, Iowa.

Please send me Free Johnson Catalog.

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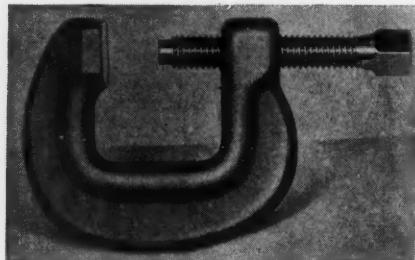
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in 20 yard rolls in widths of 30, 36, or 42 inches, or in sheets of the size required.

Peco High-Strength C-Clamp

Designed particularly for use in aircraft industries, a high-strength C-



Peco High-Strength C-Clamp

clamp which is said to have a breaking point of 7,800 lb. is now being manufactured by the Products Engineering Co., 700 E. Florence Ave., Los Angeles, Cal. The clamp is drop-forged and all parts

are completely heat treated. The screw is of a square head type.

The Peco High-Strength C-Clamp is regularly available in 1 1/4-inch size. Other sizes can be obtained on special order.

Walker "Hole Hog" Boring Bar Holder

Designed for use in boring, turning, threading, facing, and so on, the Walker "Hole Hog" Boring Bar Holder shown in the illustration is now being marketed by National Engineering Products, Inc., Commerce & Savings Bldg., Washington, D. C. The holder is a one-piece semi-steel casting having screws which are hardened to prevent mushrooming. A gage is provided which can be quickly adjusted for use in boring, threading, chambering, and counterboring to a shoulder.

In use, the holder together with boring bar is arranged so as to straddle the regular lathe tool post and is clamped in position with lathe turning tool extending through rectangular holes in holder, thus permitting both

SHEAR-CUT HIGH SPEED END MILLS



Here's a complete line of
Single and Double End Mills.

They save time and money.
SPECIFY PROGRESSIVE SHEAR-CUT END MILLS.

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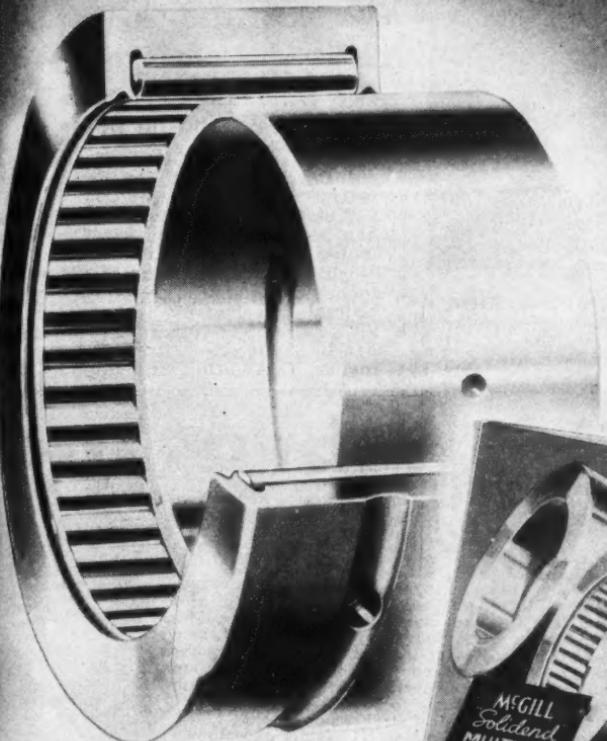
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MCGILL

Precision BEARINGS



New Bulletin
SM-42

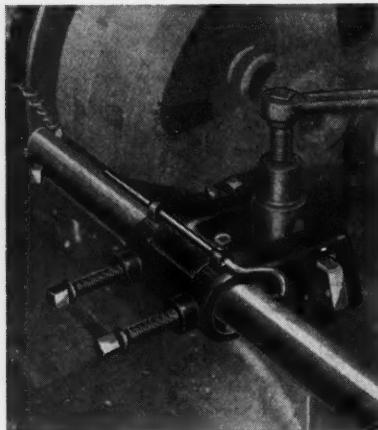


Bearing Division

MC GILL

MANUFACTURING CO.
1500 North Lafayette Street
VALPARAISO, INDIANA

boring and facing operations to be performed without removing or replacing tool post. The three-point or wedge



Walker "Hole Hog" Boring Bar Holder

principle employed in holding the boring bar is said to enable heavy cuts to

be taken, with the holder remaining rigidly in position.

The Walker Hole Hog Boring Bar Holder is available in four sizes; namely, No. 0 with bar capacity of $\frac{1}{4}$ to $\frac{1}{2}$ inch and lathe swing of 9 to 12 inches, No. 1 with bar capacity of $\frac{3}{8}$ to 1 inch and lathe swing of 11 to 14 inches, No. 2 with bar capacity of $\frac{1}{2}$ to $1\frac{1}{2}$ inches and lathe swing of 16 to 24 inches, and No. 3 with bar capacity of $\frac{5}{8}$ to 1 inches and lathe swing of 20 to 40 inches. Net weight of each size holder is $2\frac{1}{2}$, 4, 10, and 22 lb. respectively.

G & S Redesigned No. 0 Vertical Mill and Jig Borer

The G & S No. 0 Vertical Mill and Jig Borer described in the November 1941, issue of MODERN MACHINE SHOP has been redesigned. The table has been increased in size from 6 to 16 inches to $6\frac{1}{2}$ x 20 inches, and is provided with a longitudinal travel of 12 inches as compared to a previous longitudinal travel of $8\frac{1}{2}$ inches. The overall height of the pedestal type machine has been increased from 54 inches to 58 inches. In addition, the shipping weight

*BURGESS vibro-tool

Puts Permanent Identification Markings On Industrial Materials, Production Parts, and Finished Goods

Plants everywhere find Vibro-Tool offers the simplest, fastest and most economical method of marking jigs and dies for identification; cutting identifying numbers on production parts; engraving names on identification disks; engraving trade-marks or other insignia on finished goods; writing names of persons or departments on tools or other equipment; cutting cloth patterns; engraving names or designs on glass; cutting rubber patterns and gaskets, etc., etc.

Tool uses vibration principle...120 vertical strokes per second...60 cycles, operating from any 110 volt AC outlet. (Does not operate on DC.) Made of finest materials; encased in plastic case. Can be used skillfully by average workman.

Hard steel is easily marked by using a Tungsten needle. Transformer available for use in connection with Vibro-Tool to etch on exceptionally hard steel through invoking the electric arc process. Transformer may be used for long periods without getting overheated.

Portable; weighs only 1 lb. Price complete \$7.50, for carton containing tool and ordinary needles. Special needles, cutting points and other accessories available at reasonable extra cost.

Send for illustrated folder giving complete details, gladly sent FREE.

BURGESS BATTERY CO.

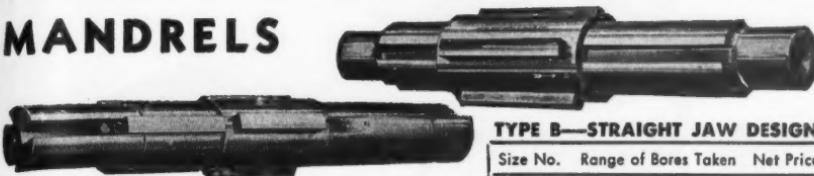
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ORDER NICHOLSON EXPANDING
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**TYPE A
STEP JAW
DESIGN**

Prices
Subject to
Change

Size No.	Range of Bores Taken	Net Price
1A	1/2" to 1"	\$12.00
2A	1" to 1 1/2"	16.00
3A	1 1/2" to 2"	23.00
4A	2" to 3"	34.00
5A	3" to 4"	40.00

TYPE B—STRAIGHT JAW DESIGN

Size No.	Range of Bores Taken	Net Price
1X	1/2" to 1 1/8"	\$10.00
2X	1 1/8" to 2 1/32"	11.00
3X	2 1/32" to 3/4"	12.00
00	3/4" to 7/8"	14.00
0	7/8" to 1"	16.00
1	1" to 1 1/4"	18.00
2	1 1/4" to 1 1/8"	21.00
3	1 1/8" to 2"	29.00
4	2" to 2 1/2"	40.00

(Other Sizes taking up to 7")

ECONOMY TOOLS . . . for holding work while being machined between centers on lathes, grinders, millers, shapers, etc. Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Write for bulletin.

W. H. NICHOLSON & CO., 136 OREGON ST., WILKES-BARRE, PA.

**MAC-IT
Quality Steel Screws**

In some applications, regular cap screws may not provide the desired holding power or margin of safety.

Mac-it hex head cap screws, milled from the bar and heat-treated, have the strength needed for these extra tough jobs.

OTHER MAC-IT PRODUCTS INCLUDE:
Socket Head Cap Screws • Hollow Set Screws • Square Head Set Screws • Stripper Bolts • Hexagon Socket Pipe Plugs

THE STRONG, CARLISLE & HAMMOND COMPANY
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INCREASE TOOL LIFE WITH PROPERLY PREPARED COOLANTS

You can save time, increase tool life and improve tooled surface finishes by preparing your soluble coolants and cutting compounds with a "LIGHTNIN" Mixer.

Whether you "make-up" for individual machines or have a central circulating or cooling system, a "LIGHTNIN" of the proper size and capacity is available to solve this problem for you. "LIGHTNIN" MIXERS CAN BE READILY CLAMPED ONTO ANY TANK OR VESSEL. They have been successfully used in large plants for mixing cutting oils for over twenty years!

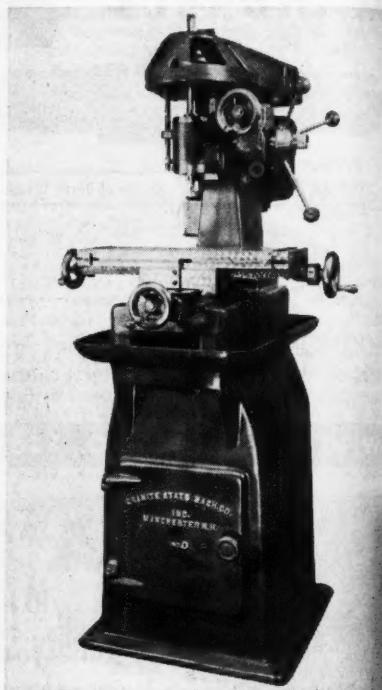
Write for a catalog of "LIGHTNIN" Mixers. State the size of tank or tanks you use and the current available. Complete details will gladly be furnished.

MIXING EQUIPMENT CO., INC.

1048 GARSON AVE., ROCHESTER, N.Y.

of the bench type and floor type machines is now 500 and 900 lb. respectively as compared to a previous 350 and 700 lb. The head of the G & S No. 0 is also now completely enclosed.

The G & S No. 0 Vertical Mill and



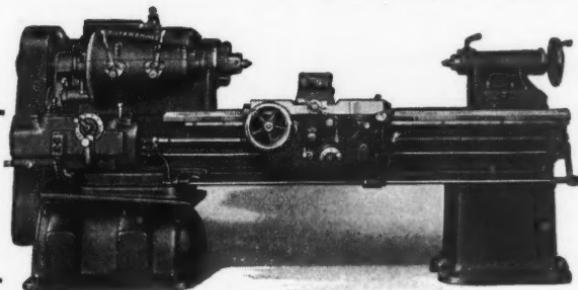
G & S Redesigned No. 0 Vertical Mill and Jig Borer

Jig Borer is marketed by the H. Leach Machinery Co., 337 Charles St., Providence, Rhode Island.

Stow Flexible Drill Shafts

A line of flexible drill shafts available with either 45 or 90-deg. Park angle head permanently attached to shaft or with straight spindle for use with adapters has been introduced by the Stow Mfg. Co., Inc., 1 Shear St., Binghamton, N. Y. The shafts are designed to readily fit into the chuck of portable electric drills, providing an extension which bends around or

BOYÉ & EMMES ENGINE LATHES



THE BOYÉ & EMMES MACHINE TOOL CO.
CINCINNATI • OHIO

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CERROMATRIX (Melting Temp., 250° F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, for engraving machine models, stripper plates, chucks, short run forming dies and other metal-working applications.

CERROBEND (Melting Temp., 158° F.) Used as a filler in bending thin-walled tubing to small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

These two low-temperature-melting and expanding alloys are helping to speed up production of war materials for the Army, Navy and Air Force.

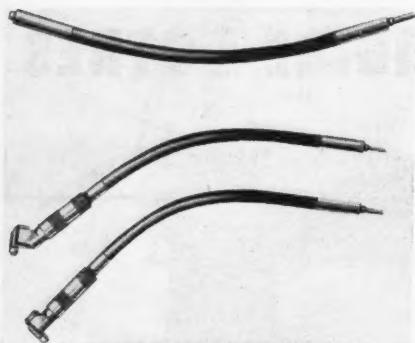
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Los Angeles, Calif., Castaloy Corporation
Montreal, Can., Dominion Merchants Ltd.

CERRO DE PASCO COPPER CORPORATION
40 WALL STREET NEW YORK, N. Y.

ners, reaches into awkward out-of-the-way places, corners, and so on. The core and case of the shafts are constructed to provide maximum strength and flexi-



Stow Flexible Drill Shafts

bility for long heavy duty service.

The drill shaft with straight spindle is available in a standard length of 30 inches but may also be obtained in shorter lengths or longer lengths up to 48 inches

maximum. The shaft spindle accommodates either a $\frac{1}{4}$ -28 or $\frac{1}{8}$ -24 N. F. thread adapter. Drills of any size up to No. 30 may be used.

Drill shafts with Park angle heads are available in standard lengths of 18, 30, 36 and 48 inches and are designed for use with any size drill up to No. 30. A feature of the Park angle head is a patented chuck mechanism which permits the use of cutoff or broken drills.

"Filtaire" Portable Dust Collector

Known as the "Filtaire," a portable dust collector particularly suited for use with grinding and polishing machines where no central dust collecting system is available is announced by the Edward Blake Co., 634 Commonwealth Ave., Newton Centre, Mass. The motor and fan are located behind a replaceable Dustop filter so that all bearings are protected from dust and grit. The $2 \times 16 \times 20$ -inch Dustop filter is made from fireproof spun glass and is large enough so that, in certain cases, it may be inverted and the other half used when the first half becomes filled. The purified air is expelled through

ASSEMBLIES MADE IN SECONDS

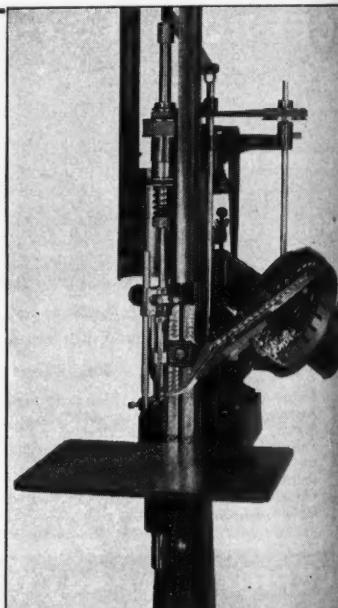
OLD METHODS TAKE MINUTES.

Use POWER SCREWDRIVERS
and
CUT YOUR COSTS.

THREE MODELS.

Send Samples for Production
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WHITNEY MILLING CUTTERS

for Uniform Seating of
Whitney Woodruff-type Keys



No need for skilled labor...
or for filing and fitting...
when Whitney Milling Cutters are used for seating Whitney Keys. Cutters are made in all sizes to correspond with the keys which can't roll over. Complete information in Catalog V-111. Write.

The Whitney Chain & Mfg. Co.
HARTFORD, CONNECTICUT

Why THOR STAMPS Last Longer



...because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

The Pittsburgh Stamp Co., Inc.
812 CANAL ST. • PITTSBURGH, PA.



FORGE SHOP

Improves Cutting 50%

BEFORE this Mid-Western forging concern swung to Capewell's TECHNITE power blades, they ran a test. Results showed Capewell "cutting 50% better" than the blades previously used. Again Capewell sets a new record. Another piece of testimony backs up our statement that Capewell precision-cutting hack saw blades *cut costs*—because their breakage is smaller, because their sawing is faster. In addition, the accurate, precision cutting by these blades saves you vital man and machine hours on subsequent operations. Have you tested Capewell? You had better speak to your mill supply man today.

THE CAPEWELL MFG. CO.,
Hartford, Conn.,
U. S. A.



CAPEWELL



Speed Production Save Tool Room Time!

Use CLAYTON Boring Bars and Holders

- ★ add extra production hours to every shift
- ★ make heavier cuts without chatter

Clayton Boring Bar Holders offer a new 2-way clamping arrangement which: 1) permits changing or adjustment of any size boring bar within the capacity of the holder, without disturbing alignment with lathe; 2) maintains identical setting for subsequent operation when holder is removed from the lathe; 3) provides rigidity for making heavier cuts without chatter; 4) no "fingering" adjustments or bushings required for any operation.

You can get quick deliveries of Clayton Boring Bars, and save needless tool room time. They offer these superior features: 1) permanently calibrated quarter inch graduations which eliminate necessity for file or chalk marks; 2) minimum surface tension eliminates chatter and allows heavier cuts; 3) bit holes accurately broached to eliminate vibration and to insure rigidity of bit.

Speed your war production by using Clayton Boring Bar Holders... relieve your tool room of costly, time consuming bar-making work by using Clayton Boring Bars.

Bar Holders made in sizes for 9" to 36" lathes—Bars from $\frac{3}{8}$ " to $2\frac{1}{2}$ " diam., 7" to 36" long; may be ordered separately or in any quantity.



Write for literature or
phone your supply house

CLAYTON
MANUFACTURING COMPANY
Alhambra • California

a right angle elbow at the back of the dust collector, thus creating air circulation overhead.

The Filtaire Dust Collector is easily portable from one machine to another. The top of the unit is adjustable 7 inches horizontally and 20 inches vertically so that it may be positioned correctly for any machine, wheel, or type of work being produced. The Filtaire is a complete,



"Filtaire" Portable Dust Collector

self-contained unit and can be readily operated by simply plugging the electrical connection into the nearest 110-volt outlet.

Trico Automatic Oiler for Elevator Door Checks

To prevent waste of large quantities of oil, reduce maintenance, and eliminate fire hazards, the Trico Fuse Mfg. Co., 2950 N. 5th St., Milwaukee, Wis., is now marketing an automatic oiler for eleva-

DIAMONDS for Victory



BIG-HED-NIBS
LOC-KEY-SET
RE-SET-ABLE



Cooler dressing
Closer tolerances
Micrometer Accuracy
Because: Wing key
heat dissipation
and absolute dia-
mond lock nib.

Three grades of diamonds. Common quality \$12 per karat. Medium quality \$24 per karat. Select quality \$48 per karat. (Contour template diamonds supplied only in Medium and Select quality.)

All diamond sizes $\frac{1}{4}$ to 10 karat are nib mounted for immediate shipment . . . Billed subject to approval. Specific quality of diamond wanted. We recommend a minimum size of one karat for each 6" diameter of grinding wheel. (24 hour resetting service, \$1.00 post paid.) Grinders instruction card free.

DIAMOND TOOL COMPANY, No. Inc.
Sheldon M. Booth, Pres.
934 E. 41st Street CHICAGO, ILL.

ERICKSON AIDS DEFENSE

IN BUILDING

PLANES

BELL ALLISON CURTIS-WRIGHT
PRATT-WHITNEY



Precision COLLET CHUCKS for TURRET LATHES

Drill sets to any
distance. Better
Grip. Faster
Speed.

U.S. Patent
No. 2,228,685

Greater Accu-
racy. Grips on
8 points instead
of customary 3
or 4.

Chuck Shank
supplied for any
spindle or
female. Grips on
flutes as well as
on Shank. Positive
Turret
Stop.
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10th & BESSEMER AVE. CLEVELAND, OHIO

MEAD BALL-BEARING BANDSANDER INDUSTRY'S JACK - OF - ALL - TRADES

Also Works On Inside Cut-Out Openings!

Serving a swiftly-growing number of America's important Defense Contractors. For that troublesome grinding or finishing job, try "Bandsander." If it doesn't help you, it won't cost you a cent! There is not one industrial plant in America where "Bandsander"—somewhere along the line—cannot be helpful. Tool-room, template department, finishing department, production line, or elsewhere—"Bandsander" will find its place. Try it at our expense. Satisfactory preference rating required for prompt delivery.

TYPICAL Bandsander JOBS

De-burring stampings and other small parts. Removing "flash" from forgings and die-castings. Grinding cutters and tools. Cleaning up irregular edges. Smoothing and polishing metals of all kinds.

MEAD SPECIALTIES CO.

15 S. MARKET ST.

Dept. 62-A

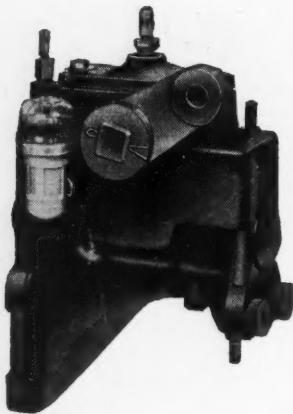
CHICAGO



For
METAL
PLASTIC
WOOD

tor door checks. According to the manufacturer, the oiler is designed to automatically provide the correct amount of

require no attention excepting the refilling of the crystal-clear bottle type oil reservoir, which shows at a glance when a refill is required.



Trico Automatic Oiler for Elevator Door Checks

oil at the proper time.

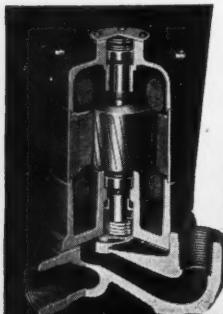
The Trico Automatic Oiler can be easily and quickly installed and is said to

"Speed-Patch" Floor Repairing and Resurfacing Material

Known as "Speed-Patch," a material for use in repairing holes, spalls, and worn expansion joints in industrial floors as well as for resurfacing floors is now being marketed by the Rock-Tred Corp. Dept. N, 605 W. Washington Blvd., Chicago, Illinois.

Speed-Patch is a ready-mixed cold plastic material which may be used as taken from the package. According to the manufacturer, the material may be applied during working hours without interrupting plant operations and is benefited rather than injured by truck traffic while applying. For complete resurfacing, Speed-Patch is simply dumped on the floor and rolled out to a smooth, ready-to-use floor.

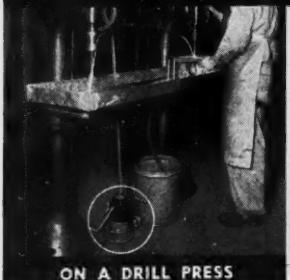
Speed-Patch is said to withstand any weight load and to provide a safe, low traction, permanent floor repair. In addition, the material is said to have a great resistance to oils and greases.



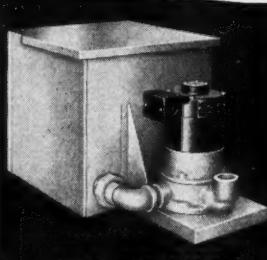
The Coolant Pump For Every Job— **BRADY-PENROD MODEL 600**

Durable! This pump stands up under hard use. Hydraulic efficiency as high as 70%. Quickly installed by any shop man at little cost and easily moved from one job to another. Controlled flow—60 g.p.h. with $\frac{3}{8}$ " tubing to 1200 g.p.h. with 1" pipe. $\frac{1}{8}$ H.P. NEMA motor meets any demand with negligible current cost. **Tank With Built-in Baffle.** 12" x 12" heavy galvanized sheet iron gray outside. Removable lid for cleaning without disconnecting return piping.

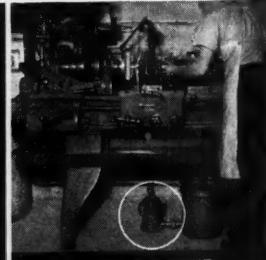
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BRADY-PENROD, INC., Muncie, Indiana, U.S.A.



ON A DRILL PRESS



PUMP AND TANK



ON A LATHE

36" x 4
accurately
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with ad
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70 S. CLIP

MILWAUKEE SURFACE PLATES



36" x 48" . . . semi-steel . . . accurately machined. Securely mounted cast legs are machined and provided with adjusting screws for perfect alignment. Shipping weight, 1300 lbs. Also larger or smaller plates with planed or scraped surface. We also manufacture angles and parallels as shown underneath surface plate.

Write for details.

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HEAT-FAG and ACCIDENTS *Ride Together*



AVOID HEAT-FAG . . . USE
MORTON'S
SALT TABLETS

SALT LOSS . . . Slows Up Production

Salt lost by sweating must be replaced or workers tire quickly — accuracy and alertness are dulled. Lowered efficiency, mistakes and accidents take their toll.

MORTON'S Salt Tablets

Install Morton's Dispensers by all drinking fountains, so workers can take tablets to replace the salt lost by sweating.

ORDER NOW!

Salt Tablets, Case of 9000 - \$2.60

Salt-Dextrose Tablets, Case of 9000 - - - - \$3.15

Dispensers

500-tablet size - - - - \$3.25

1000-tablet size - - - - \$4.00



MORTON SALT COMPANY, Chicago, Ill.

WRITE FOR FOLDER

DEARBORN Automatic Chucking and Indexing Fixture

MILLS OVER 1000 PARTS PER HOUR

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

J. W. DEARBORN
70 S. CLIFF ST. • ANSONIA, CONN.



"TRUMORE" DIAMONDS

Truly Economical for Truing Grinding Wheels

Sectional view of long, natural diamond.

Never wears dull. Requires no resetting.

Furnished in any type of mounting desired.

(Norton Hex. shown)

Diamond held securely in special nickel alloy.

Write for Circular. Price for complete tool: $\frac{1}{2}$ carat \$3.50, $\frac{1}{2}$ carat \$7.50, 1 carat \$22.00. All sizes up to 5 carats in stock. Immediate shipment.

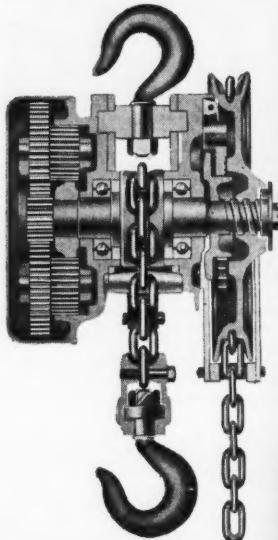


F. F. GILMORE & CO.
112 DARTMOUTH ST. • BOSTON, MASS.

Diamond Importers and Toolmakers

Coffing Model Y-C Spur Geared Chain Hoist

An improved standard type spur geared chain hoist recommended for many applications in practically all lines of industry where a maximum amount of speed, safety, durability, and efficiency are essential is now being manufactured by the Coffing Hoist Co., Danville, Illinois.



Coffing Model Y-C Spur Geared Chain Hoist

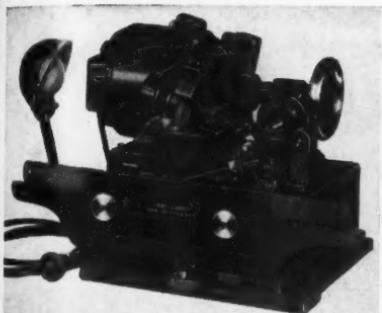
The hoist, which is designated as the Model Y-C, is equipped with a dust guard to protect the Weston type brake from dust and dirt. Heavy suspension plates are said to provide an unbreakable support between top hook crosshead and load sheave. These plates are also said to directly support the saddle for double-chain hookup and eliminate the use of a top yoke, thus reducing weight and headroom and permitting hoist to hang evenly at all times. The load sheave is mounted on two heavy precision ball bearings, enclosed and protected from dust and grit.

The Coffing Model Y-C Spur Geared Chain Hoist is built in six capacities, namely, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, 3, and 4 tons.

"Produc-Trol"

Shown here is an ingenious device designed to provide production and pur-

SHARPEN Dull Blades to Speed Production



The compact Howe-Lindsey Automatic Saw Sharpener handles any size, hack or band saws, circular saws up to 20" in diameter, and metal slitting saws and milling cutters up to 5 1/16" face. Operates at a speed of 83 teeth a minute.

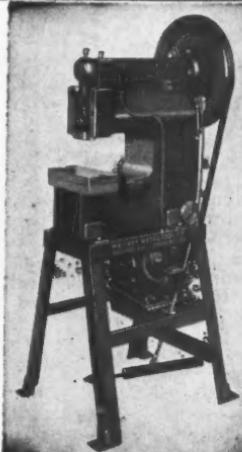
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Howe & Son, Inc., Hinsdale, N. H.

WHITNEY-JENSEN TOOLS

No. 5 129 & 130 POWER PUNCH PRESSES

Capacity 10 tons. Length of stroke, 1 1/4". Stroke adjustment, 1 1/4". Die space stroke down, adjustment, up 6". Depth of throat, No. 129, 12"; No. 130, 18".



Whitney Metal Tool Co.
110 FORBES ST. ROCKFORD, ILL.

Air-O-chekp
TRADE MARK



The LEAKPROOF AIR GUN

For Factories, Machine Shops, Foundries.

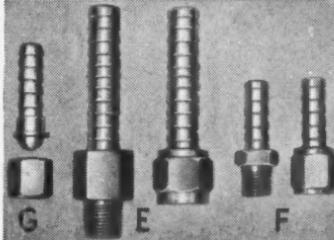
Repeat orders by the hundreds from leading plants.

Try an Air-O-Chek—sample on approval.

The only air gun with enclosed lever that operates valve thru ball and socket joint. Leakproof—no packing gland. Saves air. No external levers or buttons. Simple, compact design. Long service—less maintenance. Priced low.

Made of bar brass and stainless steel. Sizes for $\frac{1}{8}$ " to $\frac{3}{4}$ " air hose.

Many types for all requirements. Thousands used with outstanding success. Shipped promptly from stock. Catalog on request.

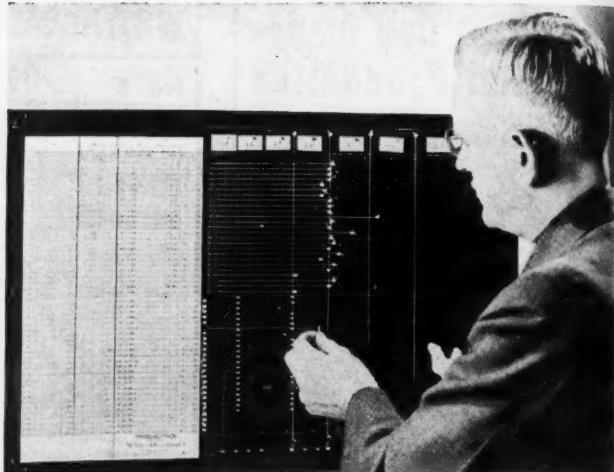


Fittings for Air and Welding Hose. Standard and extra long shanks. Shipped from stock. Catalogs on request.

AIR-WAY PUMP & EQUIPMENT COMPANY, 403 S. Jefferson St., Chicago, Ill.

chasing executives with a quick means for observing all facts concerning raw materials, parts, assemblies, machine and man-hours which has been developed by the Wassell Organization, Westport, Connecticut.

The device, which is known as the "Produc-Trol," lists parts, assemblies, sub-assemblies, or individual operations on a part at the left of the board. Movable tapes operating from left to right on pulleys bring all pertinent facts into instant focus. Double rows of peg holes under the movable tapes and various colored pegs permit many arrangements

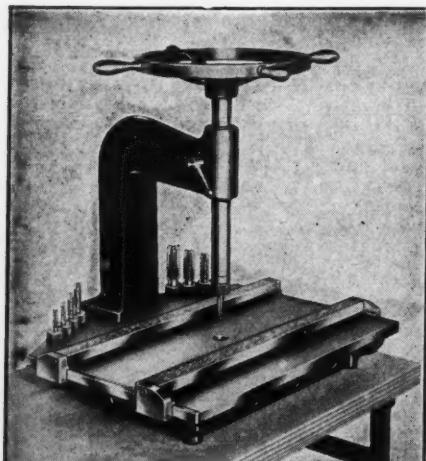


of comparative data and control required for any operation.

Produc-Trol units are available in sizes to fit specific needs. Models are also available for individual and group incentive plans.

VIKING TAPPER

Saves Time...Taps...Trouble



Base, semi-steel casting, well ribbed and seasoned to prevent warping.

Two sliding parallel bars to hold work in place while tapping.

Quick changing adaptors, requiring but five seconds to change tap.

Steel spindle hardened, ground and lapped to a perfect gage fit.

Spindle lock for holding spindle in position. Two spindle bearing bushings hardened, ground and lapped.

Handwheel, semi-steel casting with four inserted steel handles.

Bracket arm, semi-steel casting bottom scraped to insure spindle is perfectly square with base. Capacity $\frac{1}{4}$ " to $\frac{3}{8}$ ".

Send for Circular.

THE VIKING
TOOL & MACHINE CORP.
20 MAIN ST. BELLEVILLE, N.J.

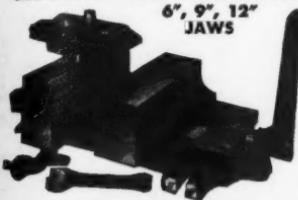
Save many and t...
drills, Various
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By any pattern knurling cut kn...
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1806 E...

GRAHAM MULTI-PURPOSE VISE

6", 9", 12" JAWS



Sold plain or with attachments.

Save countless toolmaking hours by using this many-purpose vise instead of making jigs and fixtures for repeat-operation work on drills, planers, millers, shapers, grinders. Various special jaws available. Also sold plain.

Knurl Holder for Lathe Turret

By angular adjustment, this tool makes many patterns of spiral, straight and checkered knurling all with the same pair of straight-cut knurls. Shank to fit your turret. Also made to pass over stock of larger diameter than section to be knurled.

Illustrated price circulars upon request.

GRAHAM MFG. CO.

39 BRIDGE ST. EAST GREENWICH, R. I.

NEAT STAMPING in NAME PLATES



Nameplate Detail Press

This machine quickly stamps details and serial numbers into name plates.

Write for Particulars

GEO. T. SCHMIDT, Inc.
1806 Belle Plaine Ave. Chicago, Ill.

HOW TO SAVE Grinding hours



HAMMOND "600" DRI-N-WET Belt Grinder

Many times faster on a host of jobs usually done on other equipment, and at a fraction of their cost. The Hammond "600" put to work will save hours of your other valuable machining time. It's a new high-speed machining method to help you "beat that delivery promise."

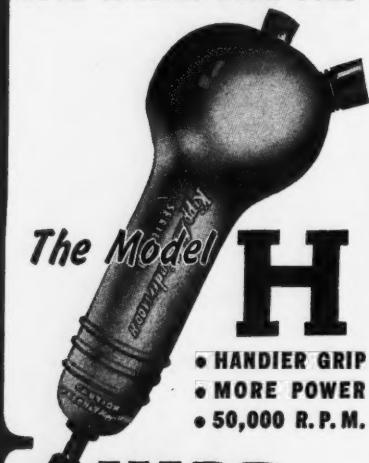
WRITE FOR BULLETIN GP-7

Hammond
Machinery Builders
INC.

1615 DOUGLAS AVENUE, KALAMAZOO, MICHIGAN
Eastern Branch, 71 West 23rd Street, New York City

You'll Agree!

"...THE BEST ALL AROUND
OFF-HAND GRINDER OUR
TOOL-MAKERS EVER USED"



- HANDIER GRIP
- MORE POWER
- 50,000 R.P.M.

KIPP *Air* GRINDER

Madison-Kipp tool-makers originated the first really high speed grinder. They know a great deal about the practical side of grinder design and grinder usage. They think the new Model H is the best all around off-hand tool they have ever tried and we are sure you will agree with them. If you are doing priority work...

Order Today \$29⁷⁵

Please attach preference rating
certificate with order.

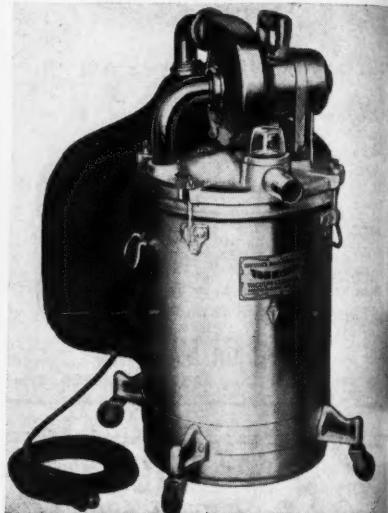
MADISON-KIPP CORP.

208 WAUBESA STREET

MADISON, WIS., U. S. A.

"Tornado" Model 117 Hi-cycle Vacuum Cleaner

To meet the need for a portable, powerful vacuum cleaning unit for production-line cleaning, Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago, Ill., has developed the "Tornado" Model 117 Hi-cycle Vacuum Cleaner shown here.



"Tornado" Model 117 Hi-cycle Vacuum Cleaner

with. Besides being light of weight and readily portable, the unit is claimed to have the added features of high speed operation and durability, and is especially suited for continuous heavy duty cleaning. The high rate of speed at which the cleaner operates develops additional suction strength required for picking up welding flux, scrap, heavy particles of dust or dirt, water, and other materials or debris.

The Hi-cycle motor of the unit is designed for operation on 220-volt, 180-cycle current only. The cleaner is supplied complete with 20 feet of four-conductor cable but without socket or attachment plug.

Additional Design Features for P&H Trav-Lift Cranes

Harnischfeger Corp., 4535 W. National Ave., Milwaukee, Wis., announces that its P&H Trav-Lift Cranes are now avail-

"FU
REQ

increased
varying
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Decker's
aid to
machine
non-glare

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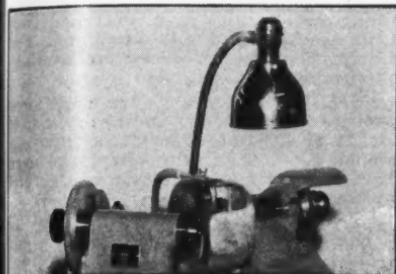
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For your
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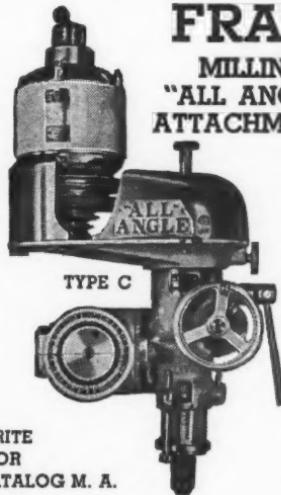
"FULL SPEED AHEAD" REQUIRES BEST LIGHT

Increased night work...faster production...unvarying accuracy...all demand VIMCOLIGHT'S localized, high-intensity illumination. **Black & Decker's** Valve Refacer provides this important aid to "stepped-up" operations. Increase YOUR machine output with Vimcolight...adjustable, non-glare, low-in cost. Write us!

VIMCOLIGHT

VIMCO MANUFACTURING CO.
1111 NANAHAN ST. BUFFALO 1, N. Y.

FRAY
MILLING
"ALL ANGLE"
ATTACHMENTS



WRITE
FOR
CATALOG M. A.

FRAY MACHINE TOOL CO.

503 W. WINDSOR GLENDALE, CALIF.

WHEN YOU NEED

POWERFUL
ECONOMICAL
RELIABLE
POSITIVE
COMPACT
QUIET
DRIVES

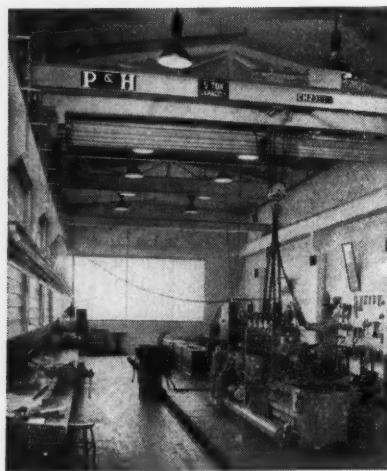
For your slow speed machines, requiring 1/50 to 7 1/2 H. P., at speeds as low as .08 r.p.m., which will give years of trouble free service.

WITHOUT USING
BELTS—PULLEYS—CHAINS—
SPROCKETS—LINE SHAFTS
OR SLIDE RAILS TRY
one of the 47 types of



Janette Manufacturing Company
556-558 West Monroe Street Chicago, Ill. U. S. A.

able with two additional features as standard equipment. All double I-beam



5-Ton Floor-Operated P&H Trav-Lift Crane

cranes employing a motor-driven trolley are now equipped with a drag brake on

the trolley, and all cage controlled Trav-Lifts are furnished with a foot gong. Formerly, these accessories were available on special order only.

P&H Trav-Lift Cranes are made in capacities up to 15 tons and are said to be ideal for intermittent service and for supplementary usage with the large overhead traveling cranes also manufactured by Harnischfeger.

Bijur Solenoid-Operated Lubricator

A solenoid-operated lubricator which can be applied to machine tools for use in automatically lubricating various parts, particularly semi-isolated units, has been placed on the market by the Bijur Lubricating Corp., Long Island City, N. Y. A pump and reservoir unit together with branched oil feed line, junctions, and meter-units which are located at bearing surfaces in the machine to be lubricated comprise the assembly of the lubricator.

The illustration shows the pump of the Bijur Solenoid - Operated Lubricator mounted on removable cover plate of special RMZ Rotomill. According to

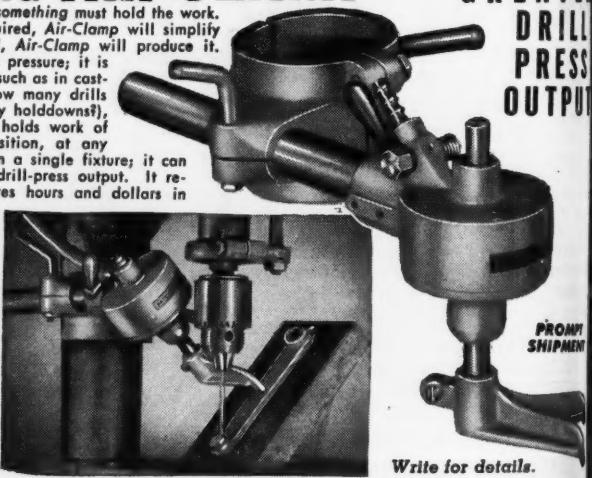
ANNOUNCING AIR-CLAMP

Wherever a drill comes down, something must hold the work. Wherever a drilling-jig is required, Air-Clamp will simplify it. Wherever speed is desired, Air-Clamp will produce it. Air-Clamp holds with relentless pressure; it is undisturbed by size variations (such as in castings), it scoffs at vibration (how many drills have been broken due to faulty hold-downs), chatter, snagging. Air-Clamp holds work of any size or shape in any position, at any angle. It can pay for itself on a single fixture; it can save its cost on a few days' drill-press output. It reduces operator fatigue. It saves hours and dollars in drafting-room, jig department, tool room and production line. Air-Clamp fits any drill-press having a cylindrical column. Special fixtures for Tee-slotted tables, light milling work, etc. Hand and/or foot control. Shipped on approval to responsible concerns.

Foot Air Control Ready!



For
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FOR
GREATER
DRILL
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OUTPUT

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Write for details.

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THE GR
96 Skillman

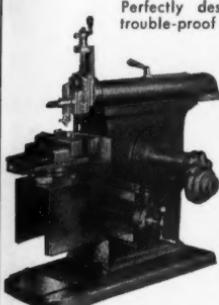
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June, 1942

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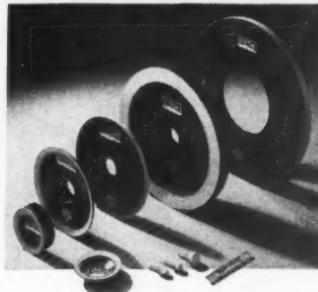
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THE GRANT MFG. & MACHINE CO.
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RESINOID
BONDED

SECOMET



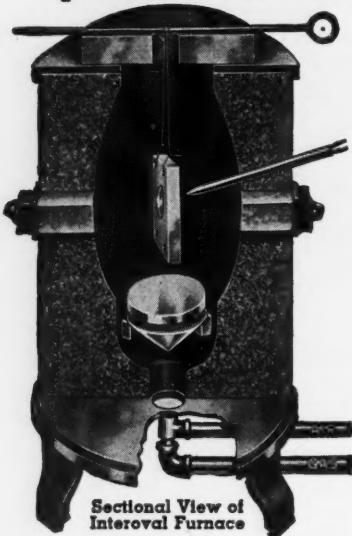
SECOMET Resinoid Bonded Diamond Wheels can do your work more accurately, faster, and without appreciable wear. They are most economical for sharpening cemented carbide and multi-bladed tools, such as milling cutters, broaches, etc. Moreover, their sharp, free-cutting action eliminates lapping and the usual semi-finish grinding operation. Catalog on request.

Prompt deliveries

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for Heat-Treating
Expensive Tools and Dies



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Interval Furnace

No possibility of surface decarburization or distortion. Heat treats "Moly" steels without any trace of scale or soft skin.

This gas-fired furnace operates at 25c per hour for fuel. Heats to 2350° F. in 40 minutes in a non-oxidizing atmosphere. May be quickly converted into lead, cyanide or soft bath furnace.

Heating chamber—14" high, 9" in dia. at center, 7" at top.

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the manufacturer, the lubricator is adaptable to any machine layout. Meter-units can be located at any distance, height, or level in relation to

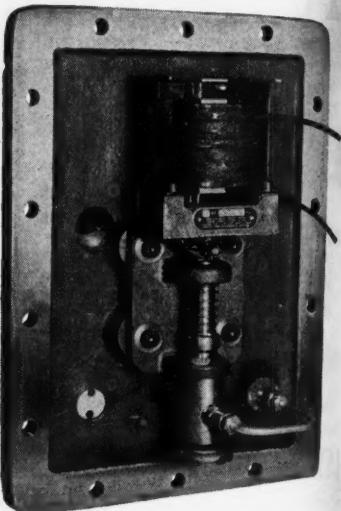


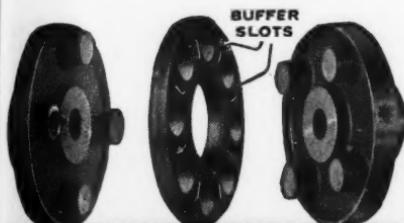
Illustration Showing Pump of Bijur Solenoid-Operated Lubricator Applied to Cover Plate of Special RMZ Rotomill

lubricator position, thereby automatically providing correct lubrication for efficient machine operation.

Elastic Stop Gang Channel Nuts

Elastic Stop Gang Channel Nuts which are said to be especially useful in the aircraft industry, particularly on fuselage and wing structures, engine cowlings, cover and inspection plates, around windows and doors, and at other points where a series of fastenings is required, are now being offered by the Elastic Stop Nut Corp., 2327 Vauxhall Rd., Union, New Jersey.

The nuts consist of specially designed Elastic Stop Nuts with four lugs at the base which are installed at specified intervals in a metal channel strip, pre-formed to accommodate the nut lugs under longitudinal flanges. The channel strip is pierced for the required nut size and spacing, and the nuts are held in place by dimples in the channel, tolerances permitting them to be virtually self-centering.



A MONEY SAVER

The BUFFER-SLOT COUPLING lengthens the life of your Motor-Driven Machines by absorbing the load shock and constant vibration that gradually wear out machinery and bring on shutdowns and repairs.

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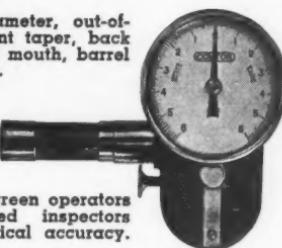
To fractions of .0001" it tells the "hole" story

COMTORPLUG

Shows diameter, out-of-round, front taper, back taper, bell mouth, barrel shape, etc.

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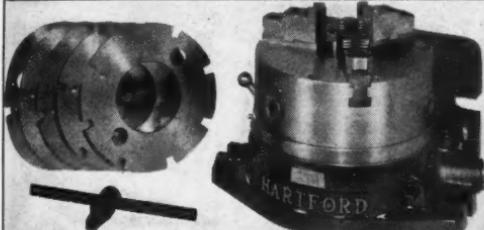


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Request Bulletin 27

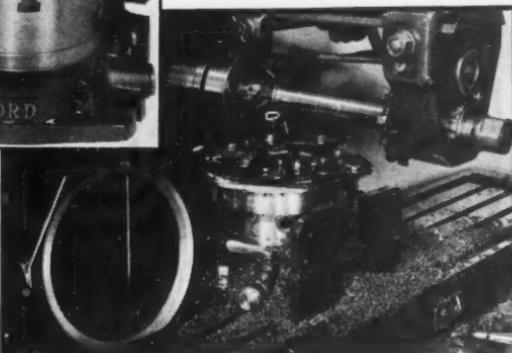
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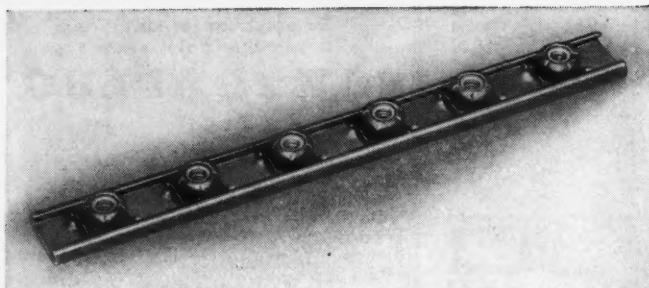


"Super-Spacer" with faceplate for straddle milling the hexagonal sides of aeronautical engine part. Locating plug to fit bore of work is strapped to faceplate.

The Hartford Special Machinery Co.

HARTFORD

CONNECTICUT



Elastic Stop Gang Channel Nuts

In use, the factory-assembled gang channel is permanently attached to the structure through bolt holes aligned with those in the structure. A locking action of the nuts is obtained by means of a vulcanized red fiber collar which resists the entry of the bolt. This action forces the nut outward, thus creating a constant metal-to-metal pressure contact throughout the threads of nut and bolt, taking up all axial play and providing a cushion against vibration stresses and impact. According to the manufacturer,

the fiber locking element retains its resiliency permanently and is not subject to fatigue under the most severe conditions of vibration.

Although the gang channel nuts are permanently mounted to the structure, individual nuts can be removed or replaced if necessary due to damage in application or use without removing the channel from its permanent position on the structure or disturbing the remaining nuts in the unit.

Elastic Stop Gang Channel Nuts are furnished in standard 6-foot straight lengths in a wide variety of nut sizes, thread systems, spacings, materials, and finishes. Nut sizes range from No. 8 through $\frac{3}{4}$ -inch bolt diameters. Spacings vary from $\frac{5}{8}$ to 3 inches between centers, depending upon the size of nuts and the character of the application. The nuts

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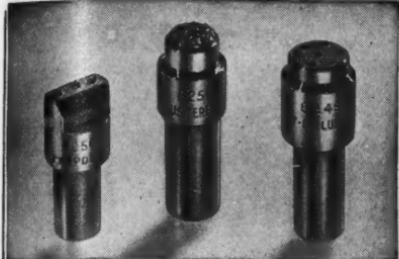
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THE CLEVELAND WIRE SPRING CO. • CLEVELAND, O.

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are furnished without countersink for regular blind mounting or countersunk for flush mounting.

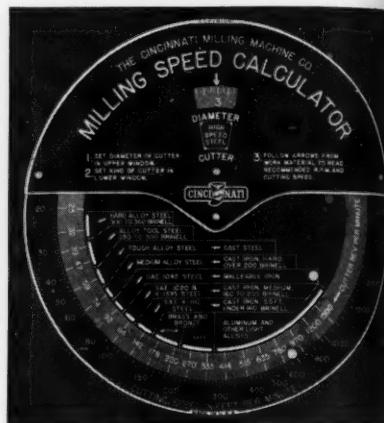
Milling Speed Calculator for Cincinnati Dial Type Milling Machines

To provide operators of Cincinnati Dial Type Milling Machines with a quick and positive means for selecting the correct spindle r.p.m. for any combination of work and tool materials and cutter diameter, The Cincinnati Milling Machine Co., Cincinnati, Ohio, is now offering its dial type machines equipped with the milling speed calculator shown here.

The calculator is, in effect, a circular slide rule which, it is claimed, can be efficiently operated without any knowledge of mathematics. The calculator consists of one stationary disc and two rotatable discs with semi-circular cover plate in which two windows are located. On the periphery of the stationary disc are scaled various cutting speeds from 20 to 4,000 feet per minute. On the top of the larger movable disc, cutter diameters are given, while at the bottom cutter revolutions per minute appear.

In the illustration of the milling speed calculator, a setting is shown as made by an operator who had a setup of S.A.E.

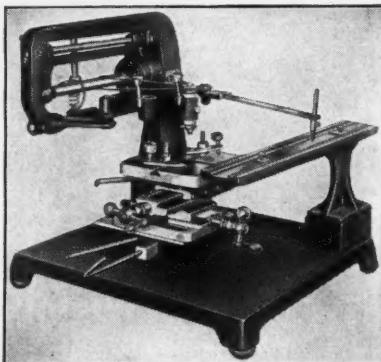
X-1112 steel with 3-inch diameter high speed steel cutter. The small disc is set so that "high speed steel" shows in the



Milling Speed Calculator for Cincinnati Dial Type Milling Machines

lower window, and the larger disc so that the arrow in the upper window points to

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Unskilled labor can produce uniform engraving on brass, aluminum, soft steel, and plastic materials.

Ideal for production work on panels, bar, indicator plates, etc.

Adjustable ratio of pantograph is 1:5 and 1:2.5.

Standard machine is equipped with universal vise which handles all types of indexing, layout, and spacing work.

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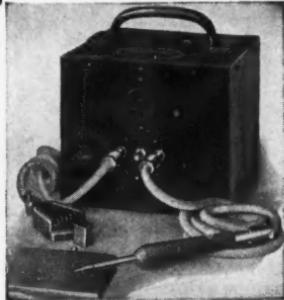
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June, 1942



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"3"—the cutter diameter. Following the arrow in the "S. A. E. X-1112" section of the smaller disc, the operator discovers the correct speed to be in the



Apprentice Setting Milling Speed Calculator
on Cincinnati Milling Machine

range 95-130 feet per minute and that when using a 3-inch cutter the spindle must be set to operate at 142 revolutions per minute.

K & B Down Draft Dust Control System

The Kirk & Blum Mfg. Co., 2815 Spring Grove Ave., Cincinnati, Ohio has developed the K & B Down Draft Dust Control System shown in the accompanying illustration. By means of this system, dust is carried off through ducts constructed under the floor thereby saving floor space, and so on. Bench-high gratings, through which air is exhausted, enable operators to conveniently handle castings for sanding, snagging, grinding, polishing, and buffing.

The K & B Down Draft Dust Control System is said to be particularly adaptable in the finishing departments of machine tool plants. With the system, it is claimed, castings can be ground and sanded within a few feet of precision machinery without the necessity of partitions or curtains. All dust particles are said to be carried down

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GROB
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"THE TOOLMAKERS
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INDISPENSABLE in every shop. It cuts with a continuous flow of chips and removes stock like a milling machine.

FASTER PRODUCTION WITH HIGHER ACCURACY

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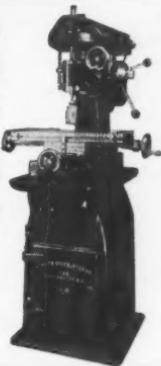
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A G & S Representative
In all principal cities.

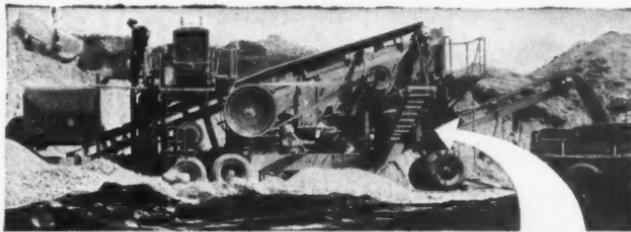


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Does Heavy Work in "Diamond" Crusher

Diamond Portable Plant illustrated crushes rock, screens gravel, produces sand. Notable features include Rotor-Lift, enclosed cut gears, high-pressure lubrication, and No. 16 Pullmore Multiple-Disc Clutch in housing indicated by arrow. Pullmore controls roll crusher, main conveyor, and sand discharge conveyor. It is operated frequently, by hand; was "selected for excellent performance, does unfailingly the heavy duty work required." Pullmore Clutches do similar excellent work in machine tools, automatic or semi-automatic processing machinery and a wide variety of other products. For maximum production on established products or new contracts requiring multiple-disc clutches, use Pullmores. Investigate, today.

Pullmore Clutches are sold by Morse Chain Co. offices in principal cities.

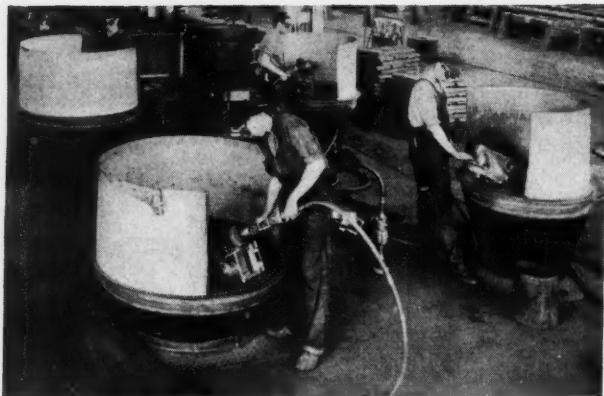
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▼ 300 CATHERINE STREET, ROCKFORD, ILLINOIS, U. S. A. ▼ *Corporation*

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Pullmore Multiple-Disc Clutches are made in single and double types, for operation in oil or dry, in standard sizes to 90 h.p. at 500 r.p.m. Write for complete data.



K & B Down Draft Dust Control System in Use

through the gratings as fast as they are released, providing a clean atmosphere.

Gilbarco Centrifugal Pump

A centrifugal pump for use in circulating any commercial cutting oil or

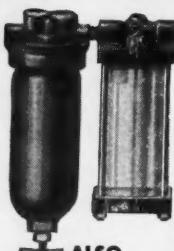
cutting compound, to be known as the "Gilbarco," has been placed on the market by the Gilbert & Barker Mfg. Co., Springfield, Mass. The pump has a $\frac{3}{4}$ -inch discharge and is designed to deliver 13 to 15 gallons of coolant per minute.

The pump, $\frac{1}{4}$ h.p. expulsion - resisting motor, and motor switch are built as an integral unit. The motor is designed for operation on 110-220 volt, 60 cycle alternating current and has an unusually low starting torque. Between the motor and

the pump is a positive mechanical seal which is said to eliminate any possibility of cutting oil or compound reaching the motor.

According to the manufacturer, with the Gilbarco Centrifugal Pump, cutting oil or compound is delivered the moment the pumps begin to operate. In

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Removes 96%
to 97% of All
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Air passes through a series of brass discs with .002 spacings, providing the finest degree of filtration obtainable by any known method. Then, as the air passes through head of Lubricator, oil is delivered into the purified air line in any desired volume.

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addition, the pump has no metal to metal contacts, a design which is said to assure smooth operation and long life. Furthermore, this construction is said to permit the handling of liquids charged with filings, small chips, and abrasive impurities, since, it is claimed, the pump will pass without stoppage or damage particles as large as thirty-five thousandths in diameter.

The Gilbarco Centrifugal Pump can be easily installed by means of four bolts located in the heavy mounting flange which surrounds the inlet port.

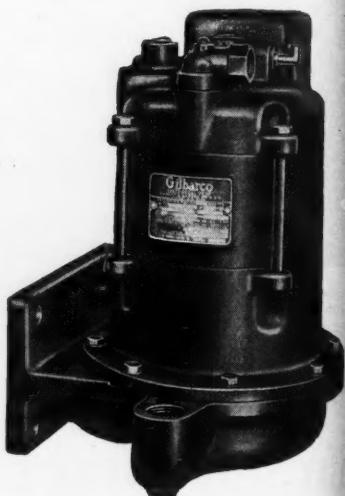


For increased production your employees need RA-TOX protection from sun-glare. Sun heat and glare rob your people of that extra effort needed for War Production. RA-TOX reduce temperature and admit 30 to 40% more light and air without draft.

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HOUGH SHADE CORPORATION
1061 JACKSON ST. JANEVILLE, WIS.

The pump is 13 inches high and $8\frac{1}{2}$ inches in diameter. The inlet flange is



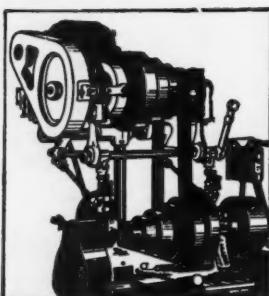
Gilbarco Centrifugal Pump

$4\frac{1}{2}$ x $7\frac{1}{2}$ inches in size. Approximate shipping weight of pump, 75 pounds.

Scherr Tool Stand

Designed primarily for holding micrometers, snap gages, and other tools thus freeing them from any heat of the hand which may distort the frame and thereby result in inaccurate measurements, the tool stand shown in the illustration herewith has been brought out by the George Scherr Co., 130 Lafayette St., New York, New York.

According to the manufacturer, the



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Speed changes are made without removing tool from the cut where Remco Drives are installed. Less down-time. More output. No tool marks. Motor takes hold gradually by slipping belt — simple friction clutch action. Shockless! No noise! Remember, Remco is the only drive on which the motor may be switched instantly if "burnt out." Folder FREE—write Remco Products Corp., State and Hay Sts., York, Pa.

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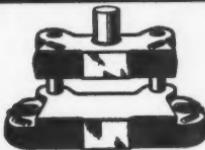
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afford a service that is unsurpassed.

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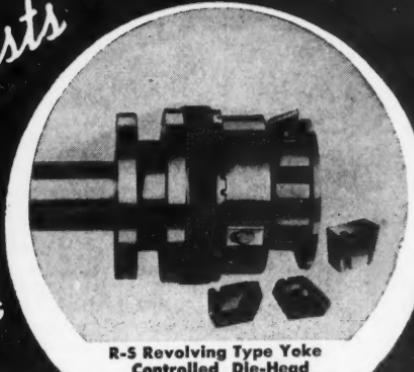
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TAPPERS

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MACHINES

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ROLLER DRIVE
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Interchangeable
and Solids
Also Specials

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BICKNELL - THOMAS COMPANY
GREENFIELD • MASSACHUSETTS

stand is constructed so that tools may be held firmly without damage to the finish of the frame. The jaws, which are of a parallel type without serrations, are made of cold rolled steel and

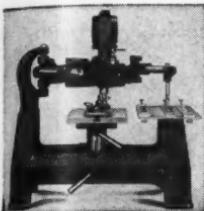


Inspector Using Snap Gage Held in Scher Tool Stand

may be swiveled from vertical to horizontal position. The base of the stand is made of cast iron.

Sav-Way Internal Grinder

A precision internal grinder designed for grinding holes up to 9 inches deep and from $\frac{1}{4}$ to 18 inches in diameter, straight or tapered sides, has been announced by the Sav-Way Tool & Machining Co., 13840 Joseph Campau Ave., Detroit, Mich. The construction of the headstock is such that by loosening two nuts the headstock can be adjusted to a distance of $3\frac{1}{2}$ inches at right angles to the wheel traverse, thus permitting the grinding of ordinarily inaccessible angles. The headstock has a traverse of 6 inches and swing of 18 inches. Variable V-belt pulleys provide four variations of workhead speed.



For
rapid
clean-cut
marking...

The Panto

COMBINED ENGRAVING, ELECTRIC-MARKING, AND ACID-ETCHING MACHINE

Pantographic bench-type machine with interchangeable heads for three classes of work. Accurate, easy to operate, built for long reliable service.

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THE
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CUTS — Wire and rods up to $\frac{5}{8}$ in.
CLIPS — Band iron up to $\frac{1}{8} \times 2$ in.
MEASURES — Length of pieces.

The lowest-priced wire and band cutter on the market. Every shop, big or small can use a WONDER CUTTER.

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The Federal Foundry Supply Co.
4606 East 71st St.,
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IT'S SURPRISING

how the proper work-bench may help workers to produce more.

HALLOWELL

SHOP EQUIPMENT

Includes 1367 bench combinations alone. The design of each is practical and modern—in keeping with today's needs—to serve better.



*fig. 732

Construction—well, just try to wear one out. Rugged through and through... built to last longer.



*fig.
1117

Send for Catalog today. See the many types available to you. Prices will please.

*Pat'd. and Pat's. Pendg.

STANDARD PRESSED STEEL CO.

Box 556

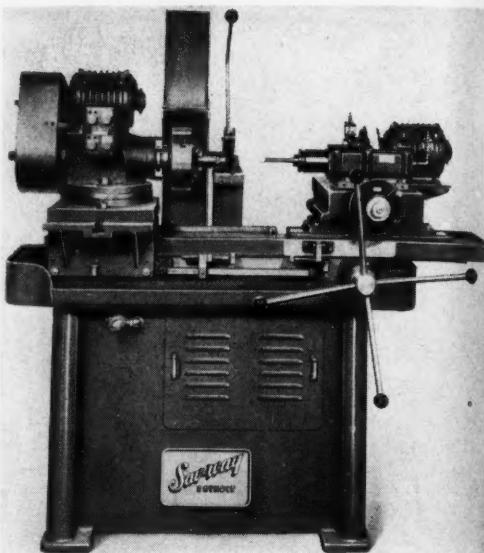
Jenkintown, Penna.

Sav-Way Internal Grinder

The Sav-Way Internal Grinder has grinding wheel head which may be adjusted to 0.0001 inch, and is provided with automatic wheel guard. The diamond holder of the machine is of the swing type with micrometer adjustment, thus enabling operator to set diamond accurately for sizing holes.

The base of the grinder is of welded steel construction. Ways, table, and cross slide are cast iron, hand scraped to 0.0002 inch. The machine is rigidly constructed throughout, with component parts accurately machined to provide smooth bearing surfaces, ease of operation, maximum efficiency, long life, and so on.

The table of the unit is located on a surface plate which is set in three V and three flat blocks, and the top of the table is scraped parallel with the ways of the grinder.



Suitable for both toolroom and production grinding, the Sav-Way Internal Grinder weighs 3,130 lb. and measures 40 x 22 inches at the base.

ARTUS ARBOR SPACERS



The COLOR tells the THICKNESS

ARTUS Arbor Spacers made of synthetic resin in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010, etc. Speed up accurate fitting at low cost. Write for folder. Spacers, Gaskets, Shims

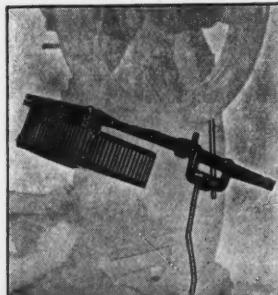
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6 Broadway

New York, N. Y.

New Method Letter Type Inspectors' Stamp

A line of stamps of the letter designation type is announced by New Method Steel Stamps, Inc., 149 Jos. Campau, Detroit, Mich. The stamps utilize single characters within simple borders of distinctive shape. Standard borders are round, oval, triangular, and square, the latter two having rounded corners to pre-



SAFETY EQUIPMENT FOR POWER AND FOOT PRESSES

Combination Gate and Barrier Guards
Two-Hand Safety Starting Devices
Sweep Guards... Single-Stroke Attachments
Treadle Guards... Fly Wheel Guards, etc.

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251 SHEFFIELD AVE. BROOKLYN, N. Y.

Preloaded Precision Bearings for Spindles.

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HIGH-SPEED
VERTICAL
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Two spindle or single spindle

Speed and more speed in the production of interchangeable parts requiring milling of any contour or outline is yours in the MOREY 12M. Provision for increased clearance between spindles and table.

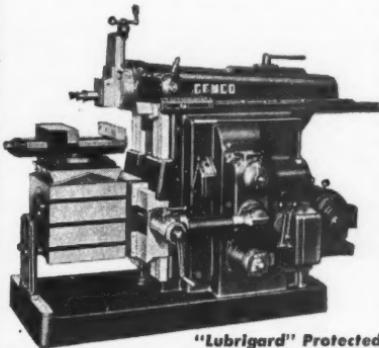
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MOREY MACHINERY CO., INC.
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Promote

INCREASED SAFETY



"Lubrigard" Protected

PLAIN • PRODUCTION • UNIVERSAL TYPE

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General Engineering & Mfg. Co.
St. Louis Missouri

ALL DOWN-HAND WELDING WITH JUST ONE SET-UP



Tilted at 135° (from horizontal) this circular weldment is being rotated at variable speed in a complete circle for down-hand welding. With push-button control in one hand and rod in the other, this welder has a "production-line" job — faster, safer, better welding on a C-F Positioner. You can speed up your work on one of these machines which handle any size or shape up to 14,000 pounds.

CULLEN-FRIESTEDT CO.,
1311 S. KILBOURN AVE. CHICAGO, ILLINOIS

vent chipping. Letters available within any border include the entire alphabet except the letters M and W, due to the similarity between the two, or a total of 24 in each style border. To ensure maximum legibility, a single letter only is used on each stamp.

By assigning different borders to inspectors or operators doing identical work on different shifts, the work done by each man can be readily identified. Thus, night and day shift workers and inspectors or various departments in a plant can be distinguished from one another.

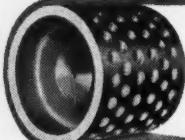
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NO BELT SLIPS WITH VACUUM CUP C. I. PULLEYS



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30 Day Free
Trial Offer.

Stock most Std. Sizes to 16" Dia.
Supply sizes 2" to 72" Dia.

The New Method Letter Type Inspectors' Stamps are available in sizes ranging from $\frac{1}{2}$ to $\frac{1}{8}$ -inch borders. Additional sizes can be obtained on special order. Knurled thumb and finger grips are pro-



New Method Letter Type Inspectors' Stamp

vided on all stamps. Letters and borders carry the exclusive Newco bevel to ensure long life, and all stamps are specially heat-treated to prevent mushrooming.

"Sealol" Balanced Pressure Fluid Seal

A balanced pressure rotary type fluid seal of compact design, to be known as the "Sealol," has been placed on the market by the Stevenson Engineering Corp., 45 Willard Ave., Providence, R.

Shut Off Expense Caused by Slippage
You Save Money on Every Installation

NEW LOW PRICED PRODUCTION LINE SEE PART LIST Prices Below

Dia. Face Price	Dia. Face Price	Increase your Production
2" x 2 1/2" — \$1.25	4" x 3 1/2" — \$2.85	
2 1/2" x 2 1/2" — 1.45	4 1/2" x 5 1/2" — 3.95	
3" x 3 1/2" — 2.25	5" x 4 1/2" — 4.25	
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We Supply Fractional Dia. and Face Pulleys—From Large Casting Stock.

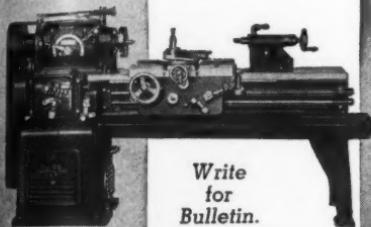
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CARROLL AND JAMIESON LATHES 15" AND 16"

12 Speed Geared
Head Motor Drive
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Modern Design—
Liberal
Dimensions



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MACHINE TOOL CO.

AKRON, OHIO U.S.A.

LINLEY Noiseless Rotary Rivet Spinning Machines

Made in a wide range of sizes and types for iron or cold rolled steel rivets up to $\frac{3}{8}$ ". Also larger rivets of softer materials.

$3\frac{1}{2}$ chrome nickel
steel spindles, heat
treated and ground
are supported at low
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row radial thrust
bearing which carries
radial load and rivet-
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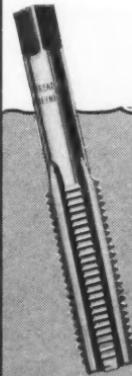


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*Victory hangs
on millions of
threads...*

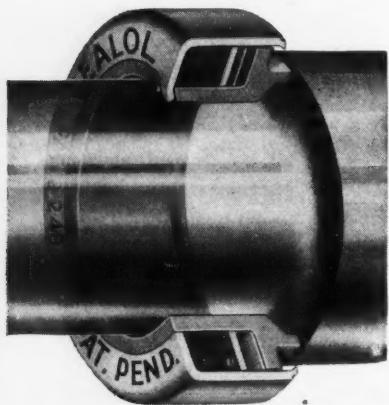


We are proud to be making
the tools that help fashion the
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and performance are words
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Greenfield, Mass. (Sales
agents: Canada — Bridge
Machinery Co., Montreal,
England — Skylux Ltd.,
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THE NEW NAME FOR
SUPERLATIVE THREADING

I. Said to absolutely seal fluids over a wide range of pressures at high speeds, the "Sealol," it is claimed, can be in-



"Sealol" Balanced Pressure Fluid Seal

stalled on shafts without special tools and is said to require a minimum of assembly space. The seal is designed

to operate in either direction of shaft rotation. The balanced pressure feature of the seal is said to minimize frictional heat and power loss.

According to the manufacturer, the Sealol Balanced Pressure Fluid Seal is applicable to plain or anti-friction bearings, excluding all foreign matter from such bearings, and can be readily adapted to special conditions.

Miccro Supreme Stop-Off Lacque

The Michigan Chrome & Chemical Co., 6350 E. Jefferson Ave., Detroit, Mich., has introduced a special Miccro Supreme Stop-Off Lacquer which is said to be extremely effective in the localized hardening of steel parts. By means of the lacquer, the usual handling and grinding operations required before heat treating are said to be eliminated.

In use, a coating of the material is applied on the areas to be hardened before they are plated. After plating the lacquer is removed from the workpieces, which are now ready for heat treatment without further preparation. The lacquer can be easily applied and removed and its use is said to require no special skill or equipment.

MUNDING BENCH RADIAL DRILL

Combines the convenience and accuracy of a sensitive drill, the range and capacity of a large drill, with the speed and flexibility of a radial. Finger-tip selection of speeds. Table swivels and tilts to any angle.



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The METCALF



Type "A"
Please mention Model KK

ABRASIVE TYPE Grinding Wheel Dresser

A complete stock of wheels and dressers carried at all times.

Mill supply and hardware dealers write for proposition.

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SKILL... and PRIDE OF WORKMANSHIP



... these are the qualities that characterize the manner in which "American Swiss" Swiss - Pattern Files are made. This old time artisan, intent on his job of forging blanks for these precision tools, is typical of the many veteran mechanics who have been making "American Swiss" Files for a quarter century and more. You can be sure that each of the 3,000 different types and sizes of "American Swiss" Files is flawless in workmanship as well as uniformly excellent in every other respect.



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American Swiss SWISS-PATTERN FILES

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SURFACE GRINDER

HANDY for accurate grinding of dies, tools, and small parts.

INEXPENSIVE—it saves valuable time to have several; placed where men can reach them quickly.

BULLETIN 644—write for a copy. Prompt delivery on priority orders.

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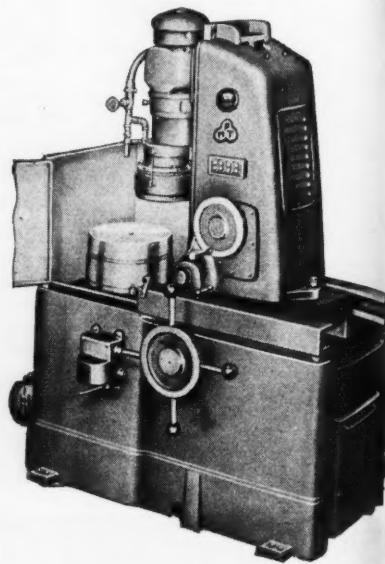
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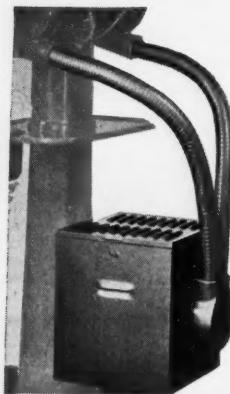
Portman Rotary Surface Grinder

A rotary type surface grinder embodying several outstanding features of design has been placed on the market by the Portman Machine Tool Co., 17 Beechwood Ave., Mount Vernon, N. Y. According to the manufacturer, the grinder is of unusually rugged construction and is amply powered to remove stock quickly and accurately and to the most exacting finish requirements. The machine is of unit type construction, consisting of a heavy box-type base containing coolant system, rugged well

proportioned motor head column, roller mounted column sub-base, and fixed magnetic rotary chuck drive assembly which is incorporated directly into the base of the machine.



Portman Rotary Surface Grinder



STOP DUST

Entirely self-contained, (motor, fan, filter, etc.) low cost, portable DUST-KOP, Model 600.

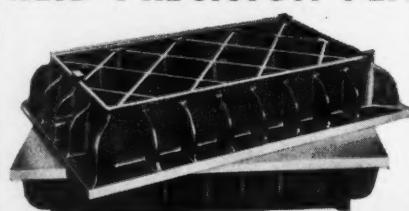
Capacity: 600 Cfm. Has $\frac{1}{4}$ HP,

GE (any voltage) continuous duty motor. Air laden dust is stopped by horizontally placed spun glass filter, drops back into removable dust pan. Widely used on WAR work on bench and pedestal tool, surface, cutter grinders, etc.

AGET-DETROIT MFG. CO.
2046 BOOK BLDG. CADILLAC 3090 DETROIT

The main drive of the grinder consists of a totally-enclosed $7\frac{1}{2}$ h.p. motor integrally mounted with precision spindle head, the spindle of the latter being mounted on oversize precision type pre-loaded bearings. The drive is said to provide unusually high torque for the 8-inch cup type grinding wheels used. The entire motor head and column assembly can be adjusted for grinding

REID PRECISION-PLANED SURFACE PLATES



Accuracy guaranteed on 12" x 18" size within .0005". On 36" x 72" within .0015". Thoroughly normalized and weather seasoned Reid Precision-Planed Surface Plates have proved thoroughly satisfactory on work to close limits.

Excellent delivery—Write for prices—details.

Tool Engineering Service Co., Inc.
241 Washington Ave. Nutley, N. J.

"NEW D & W" MAGNETIC CHUCKS

Styles 7 x 17 and 6 x 13

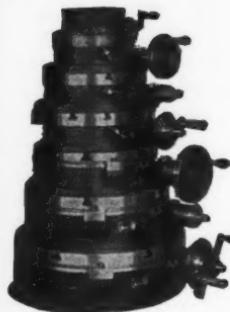


Developed to meet demand for chucks lower than our standard style.

*Send for folder covering
Chucks and Demagnetizers.*

J. & H. ELECTRIC CO.
202 Richmond St. Providence, R. I.

Troyke Rotary Tables



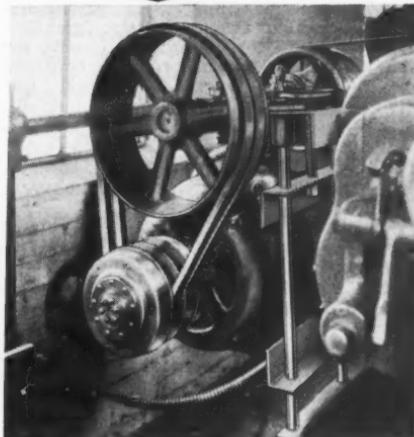
Sizes 9", 12", 15", 18", 21", 25"

Ask your dealer or write us for
eight page catalog.

ALFRED A. TROYKE
4422 Appleton St. Cincinnati, Ohio

INFINITE VARIABLE SPEEDS
WITH CONSTANT SPEED MOTORS

with
HI-LO
AUTOMATIC
PULLEYS



HI-LO Pulleys maintain constant speed at any set point and automatically regulate belt tension to load. Load is carried by cams which ride on tracks in end bells. Springs keep pulley faces up against belt at all times.

HI-LO Pulleys are easily installed on any machine and will handle drives from fractional up to 5 h.p.

*Write for folder which gives
sizes and prices and formulae
for determining proper size
pulleys.*

EQUIPMENT ENGINEERING CO.
2853 COLUMBUS, MINNEAPOLIS, MINN.

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Inc.

N. J.

June, 1942

concave and convex as well as flat surfaces.

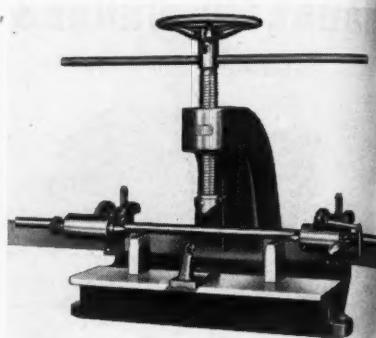
The magnetic chuck of the machine is driven by a separate motor and is provided with five feeds for use in grinding all classes of work. The chuck, which is 12 inches in diameter, is said to provide a capacity for grinding parts as large as 14 inches in diameter and 9 inches high. The coolant pump of the machine is of the unit type, supplying a large volume of coolant directly to the work and grinding wheel.

The Portman Rotary Surface Grinder occupies a floor space of approximately 3 feet wide x 7 feet front to rear and is 5 feet 9 inches high. Standard equipment includes two cup type grinding wheels, all motors, magnetic chuck, demagnetizing switch, motor controls, coolant system, splash guards, and complete wiring for immediate machine operation.

General No. 576 Hand Screw Straightening Press

Designed for use in heat-treating shops, toolrooms, and so on, for straightening a wide variety of parts, the General No. 576 Hand Screw Straightening

Press illustrated herewith has been placed on the market by the General Mfg. Co., 6433 Farnsworth St., Detroit, Mich. The press is shown equipped with



General No. 576 Hand Screw Straightening Press

lock lever center type shaft straightening attachment.

The General No. 576 Hand Screw Straightening Press is of rugged construction.

PROSSER CARBIDE GRINDERS

MODEL AA

- Quick-acting indexing tables.
- Adequate wet grinding equipment.
- High grade ball bearing spindles.
- Over-size wheels give longer wheel life.
- Moderate price.

PROMPT DELIVERIES
Write for details.

THOMAS PROSSER
& SON

120 WALL STREET

NEW YORK

Keep 'em **PST** Turning

Flexoid

INDUSTRIAL couplings



Write for
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WITH the THERMOID
HARDY Flexible discs
that aid in eliminating
wear and tear on the
driving units.

DEALERS IN PRINCIPAL CITIES CARRY
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FLEXOID COUPLING CO., Div.
THE SMITH POWER TRANSMISSION CO.

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Cleveland, Ohio

Lead screw ground
from the solid
AFTER hardening

CRITERION

Boring
Head



SMOOTH and compact.
Constant accuracy.
Parts subject to wear
are hardened. Large offset
adjustment eliminates need for
offset boring bars. Lead screw
is hardened tool steel. Its threads
are ground from the solid
AFTER hardening.

Criterion heads are unexcelled
in accuracy, in ability to withstand
constant use. Two sizes
 $1\frac{1}{4}$ " and 3". $\frac{3}{4}$ " and 1" bar
capacity. Order from your
dealer or write direct. Request
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CRITERION
MACHINE WORKS
BEVERLY HILLS, CALIFORNIA



WILLARD *Spring* TOOL HOLDERS

For aircraft, armament and accessory plants.

No chatter . . . no damaged work
. . . no breaking of cutters.

Spring feature allows faster cutting feeds with heavier cut. Cutter life is tripled. Also threading and forming tools.

Write for folder.

AUTO-ORDNANCE CORP.

Willard Tool Division

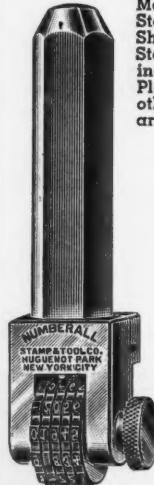
1437 RAILROAD AVE., BRIDGEPORT, CONN.

simple construction and is said to be powerful, fast, and easy to operate. Specifications of the unit are as follows: opening, 12 inches; stroke, 9 inches; throat, 5 inches; table length, 30 inches; table width, 8 inches; screw diameter, 2½ inches; screw thread, 3 pitch Acme; net weight, 620 lb.; straightening attachment track length, 85 inches; maximum swing, 6 inches diameter; standard maximum length between centers or rollers, 36 inches.

Gisholt Wattmeter Type Balancing Unit

The Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis., is now offering a portable wattmeter type balancing unit designed to detect unbalance in large rotating parts of special design without disassembly from their parent machines, thus making possible easy correction and maintenance of proper balance under actual operating conditions. Small quantities of such special machine parts with rotating speeds from 100 to 10,000 r.p.m. can be checked for unbalance with the unit, which indicates both phase angle and amplitude of vibration.

Mark It Quickly with a NUMBERALL



Made with 1 to 10 wheels. Stamp in perfect alignment. Shank for Hand or Press Stamping. Platform for stamping Name No. 45 Plates and other small Platform articles.



NEW Quick Set Machine. One wheel can be turned quickly by knurled knob for consecutive numbering.

**NUMBERALL STAMP
& TOOL CO.**

Huguenot Park,
Staten Island, N. Y.

The entire balancing equipment is contained in two conveniently-handled



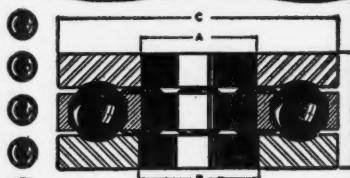
Obtaining Unbalance Indications By Means of
Gisholt Wattmeter Type Balancing Unit

cases, thereby making it capable of easy one-man transfer where needed.

Curtis Air Hoist

An air hoist especially designed for handling heavy materials in war indu

G WILLIAM



TYPE GB GROOVED RACES BALL THRUST BEARINGS

STANDARD SIZES OR SPECIAL DESIGN to your specifications; send sketch or worn sample, regardless of condition, for quotation, without obligation. • Our complete catalog will help you in making selection of bearings—shall we send it?

THE G WILLIAM CO.

358 Furman St., Brooklyn, N. Y.



DICKERMAN Hitch Feeds are adaptable to any ordinary punch press without press alterations. Feeds from any position on any style die . . . from zero to its limit (2" on 2" Hitch Feed and 4" on 4" Hitch Feed) for each stroke of the press.

Quick set-up . . . economical for short runs.

Write for Folder No. 84.

H. E. DICKERMAN MFG. CO.

321 Albany Street Springfield, Mass.

Paddock Bandsaw Guides Reduce Breakage

Model No. 0

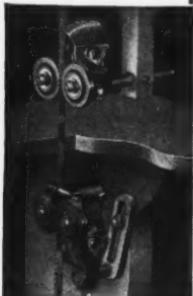
For Blades $\frac{1}{8}$ to $\frac{1}{2}$ " Wide

Model 6 and 10

For Blades $\frac{1}{8}$ to $1\frac{1}{2}$ " Wide

Shipped
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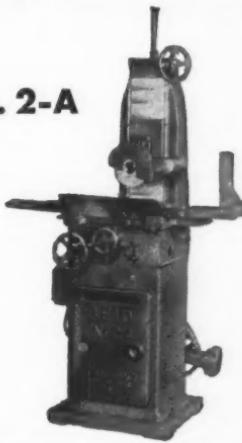
**PADDOCK
TOOL CO.**
1418 Walnut
KANSAS CITY,
MO.



REID

**Automatic Feed
SURFACE GRINDER**

No. 2-A



The No. 2A Surface Grinder will grind work 18" long, 6" wide and $1\frac{1}{2}$ " high, using a wheel 7" in diameter.

High-grade, heat treated Chrome Molybdenum steel spindles, hardened and ground.

Work table 46" long, 8" wide, with a working surface 18" x 6" and 3 T slots; Table travel is automatic in both directions.

Machine requires a $1\frac{1}{2}$ H.P., 1800 R.P.M. motor which is entirely enclosed in base.

Good deliveries if priority is attached to order.

Write to Dept. E for Circular

Exclusive Selling Agents

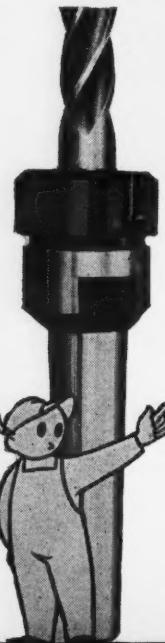
**H. LEACH
MACHINERY CO.**

387 Charles St., Providence, R. I.

Distributors in all Principal Cities

UNIVERSAL COLLET CHUCKS FOR ACCURACY AND SPEED

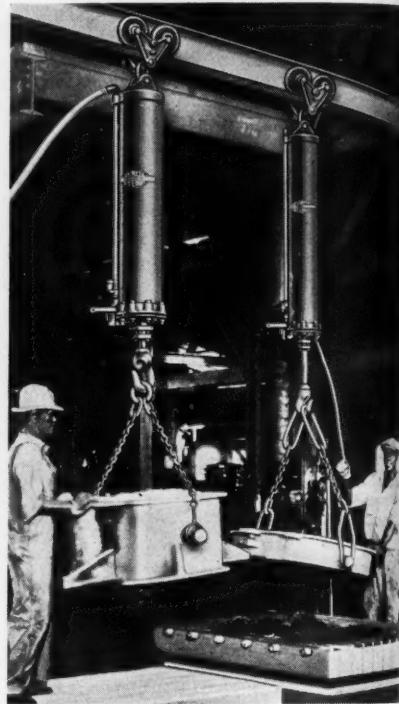
Universal floating collet chucks (right) are designed to operate horizontally in automatic screw machines and turret lathes. Adjustable spring pressure in 4 directions prevent dogtail motion and marred holes.



Universal standard collet chucks have ground threads, ample room for tool feed out and are ideal for holding end mills, keyway cutters, drills, etc. Nut fluted for Spanner wrench. Universal collet chucks grip as strong as solid steel itself. Write today for facts and prices.

UNIVERSAL Engineering Company Frankenmuth, Mich.

tries is now being manufactured by the Curtis Pneumatic Machinery Co., 1913 Kienlen Ave., St. Louis, Mo. Available in capacities up to 10 tons, the hoist, it is claimed, may be operated by unskilled



Curtis Air Hoist

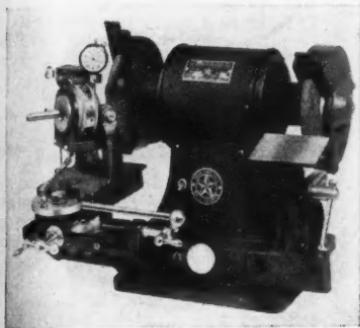
workmen and is immune to atmospheric conditions, abuse, or overloads.

Extreme accuracy of control and smooth lifting and lowering are additional features claimed for the hoist, which may be provided with speed boxes and cushions, if desired, to ensure precision operation entirely independent of operator.

Due to the simple design and construction, the Curtis Air Hoist is said to have a minimum of dead weight, thus permitting light structural or trolley and crane beams to be employed for supporting unit. In addition, easy moving of loaded hoist along runways is said to be effected.

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PERFECT POINTS ON STANDARD DRILLS SIZES No. 41 to $\frac{5}{8}$ "



Trim your drill costs with a STAR Precision Drill Grinder. Write for Folder.

Star Machine & Engineering Corp.

Division Star Electric Motor Co.,
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DAVIS KEYSEATER

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DAVIS KEYSEATER CO.

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**Die Makers
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Our new catalog No. 9 lists all accessories with complete specifications and prices.

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The Producto Machine Co.

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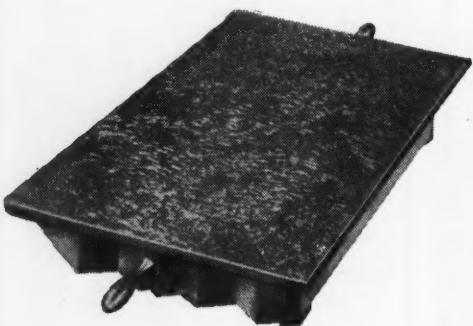
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Acme Meehanite Surface Plates

Designed to provide unusually accurate checking surfaces, a line of Meehanite metal surface plates weighing



Acme Meehanite Surface Plate

from 40 to 2,100 lb. is now being marketed by the Acme Tool Co., 200 Church St., New York, N. Y. Plates are hand scraped to extremely close tolerances, and the weight is evenly distributed throughout each plate by the

use of a honey-comb pattern. Surface contain from 14 to 16 spots per square inch.

Acme Meehanite Surface Plates are available in regular sizes of 9 x 12, 12 x 18, 18 x 24, 18 x 36, 20 x 30, 24 x 30, 30 x 36, 30 x 60, and 31 x 78 inches with heights of 3½, 4, 4½, 6½, 7, 7, 10 and 10 inches respectively. Other sizes can also be obtained.

"Kum-Kleen" Name Plate

To provide industries with a substitute for metallic name plates, identification, patent number, instruction tags, and so on, due to the conservation of all types of metal, Avery Adhesives, 451 E. 8th St., Los Angeles, Calif., has developed a product to be known as "Kum-Kleen" which is said to adhere permanently to the smooth surface of metal, glass, plastic, enamel, wood, and so on. According to the manufacturer, "Kum-Kleen" can be applied without moistening and will adhere even when exposed to high temperatures or changing climatic conditions.

THE NEW PORTMAN ROTARY SURFACE GRINDER

Combines Production Speed, Power, Capacity, Fine Finish, and Accuracy. Simplified controls enable inexperienced operators to produce precision work fast.

GOOD DELIVERIES



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Surface
rates
x 12
0, 24 x
78 inches
6 1/4, 5
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obtained

TEN TIMES THE LIFE OF TOOL STEEL CENTERS

because RED-E CENTERS have high speed steel ends which will outwear ten tool steel or carbon centers.



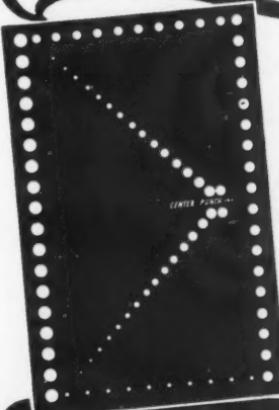
HIGH SPEED CENTERS.

CATALOG S-41

**THE READY
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**A MASTER TEMPLATE
ACCURATE TO $\pm .002''$
IN 41 MINUTES!**



Template 19" x 36" requiring 17 different round dies and center punch made by a leading radio-electronic equipment manufacturer on Wiedemann Type R-43 Micro Turret Punch. A total of 87 holes in 41 minutes.

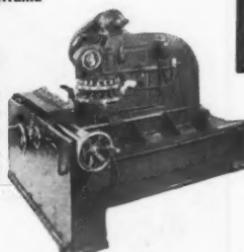
ON WIEDEMANN TYPE R-43 MICRO TURRET PUNCH PRESS

Only with a Wiedemann Micro Turret Punch will you get such speed—such accuracy—and such ease of operation. No preliminary layout; every hole is clean, accurate to $\pm .002''$; equipped with center punch for accurately locating extremely small or very large holes.

This is but one example of what the Wiedemann Micro Turret Punch can do to produce accurate templates as well as extremely accurate short run piercing jobs so often required.

No need to tie up your tool room for 8 to 10 hours on a job like this. Write today for the facts about Wiedemann Turret Punch Presses—from 8 to 80 tons capacity.

WIEDEMANN MACHINE COMPANY
1821 Sedgley Avenue
Philadelphia, Pennsylvania



Type R-43 Micro Turret Punch—one of a complete line of production equipment for low cost, small run piercing operations. The method and results are superior.

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Made in high speed
steel — $1/4''$ to 10"
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Also special saws.
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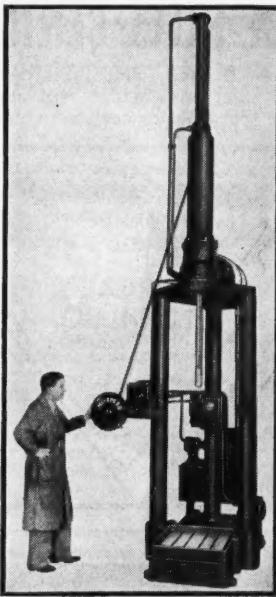
CIRCULAR TOOL CO., Inc.
767 ALLENS AVENUE • PROVIDENCE, R. I.
CHICAGO DAYTON INDIANAPOLIS PHILADELPHIA CLEVELAND NEW YORK SYRACUSE ST. LOUIS

"Hi-Speed" Honing and Lapping Machine

Surfaces of bores up to 24 inches in diameter and from 20 to 72 inches deep are said to be quickly and accurately honed by means of the "Hi-Speed" Honing and Lapping Machine shown herewith, product of the Automotive Maintenance Machinery Co., 2104 Commonwealth Ave., North Chicago, Ill. The machine, which is of rugged and versatile construction, is said to be ideal for straight line lapping or co-directional honing. The unit is designed to remove

high spots, out-of-roundness, and taper, producing round straight bores with ideal surfaces.

The design of the Hi-Speed Honing



"Hi-Speed" Honing and Lapping Machine

and Lapping Machine provides ample space for large cylinders to be placed on standard base. Variations in stroke or height under spindle nose can be easily made, thus enabling the machine to be adapted to almost any type of honing work.

The Hi-Speed Honing and Lapping Machine is constructed for easy and

Gear Specialties

With considerable experience and exceptional facilities for the manufacture of high precision Small Gears, our manufacturing capacity is now heavily burdened with National Defense work, and we naturally feel pardonable pride in the importance and quality of our contributions to the Program.

While this very essential work takes precedence, we are keenly conscious of our duty to established customers; their needs must command our continued earnest efforts. Under such circumstances, we hope new inquirers will understand our inability to give their wants the consideration they would ordinarily receive.

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EVEREDE BORING BAR



The ONLY
Boring Bar with
the economical
triangular bit.

Designed to use a larger diameter bar than formerly used because the chip is cut in front to make room for the bar. This gives you rigidity, higher boring speeds and heavier cuts.

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Representatives in all principal cities.

EVEREDE TOOL CO.

WILLIS STUTSON
180 N. Wacker Drive Chicago, Ill.

IMPROVED! Mastercraft Turret Tool Post

Always A Superior Tool
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Faster action for top production — Hardened throughout, for longer service — Self compensating for wear in hard use — Precision built for accuracy.

The new Mastercraft Turret is a fast indexing 4-way tool post for repeat operations on the engine lathe or for front cross slide on the screw machine. Especially designed for use on 9" and 10" South Bend Lathes, Sheldon, Clausing, Atlas, Logan and similar bench lathes and small screw machines.

Order through your jobber or write for literature.

MASTERCRAFT TOOLS

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Manufacturers and Selling Agents

accurate operation, all controls being located at the front of the machine. Any stroke setting, withdrawal of hone from the cylinder, changes in speed of reciprocation or rotation of the spindle, and so on, can be made from the front of the machine regardless of stroke capacity. According to the manufacturer, a positive stop and dwell system makes it possible to stop the spindle at the bottom of each stroke or at any point within the stroke range without any shock to the machine or work being honed, and to hold the spindle at that point up to 1½ minutes.

The Hi-Speed Honing and Lapping Machine is made in four sizes, any of which can be obtained with strokes up to 72 inches.

Jessop TCM High Speed Steel

The Jessop Steel Co., 608 Green St., Washington, Pa., is now marketing a high speed steel to be known as TCM, which is designed to fully replace 18-4-1 high speed steel previously marketed by the company. TCM is a low tungsten-molybdenum steel and is said to cut as well or better than 18-4-1 steel.

According to the manufacturer, no

change in operating equipment is required in using TCM High Speed Steel since it can be heat treated in the same

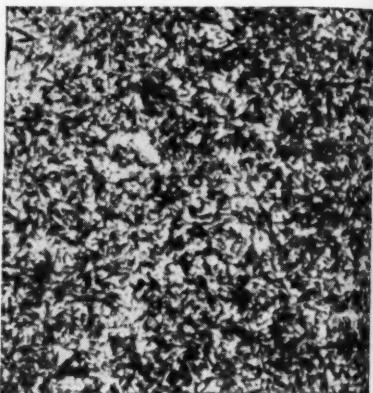


Illustration Showing Typical Hardened and Drawn Structure of TCM High Speed Steel

furnaces and the same atmospheres as 18-4-1 high speed steel. TCM Steel has a slightly lower hardening temperature

PRIORITY IN EXPERIENCE

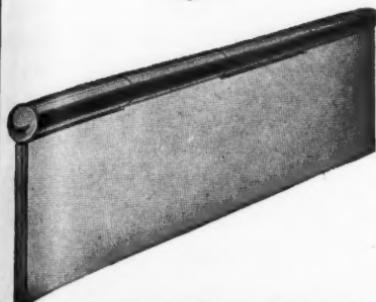
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John Hassall, Inc., 394 Oakland Street, Brooklyn, N. Y.

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Steel
same

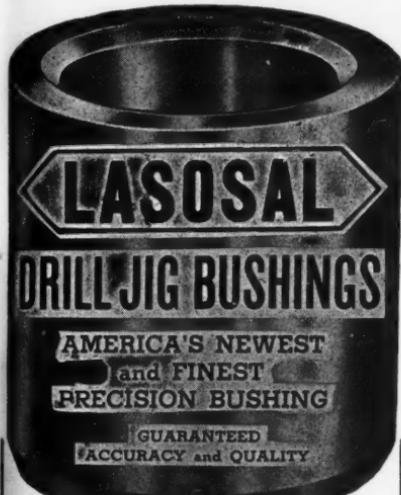


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Annual capacity over 1,500,000 Precision Bushings.
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Everyone Connected with Metal Cutting and Shaping Knows

**that correct and frequent
grinding of tools is
absolutely necessary**



You would never allow a mechanic to use a dull broach or a dull drill. You require that all tools be sharp before using and be reground the moment dullness begins.

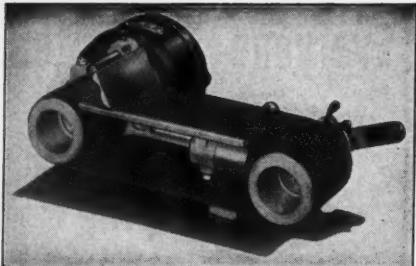
THIS NECESSARY PRACTICE HAS BEEN NEGLECTED IN REGARD TO POWER HACK SAW BLADES. THIS NEW METHOD OF GRINDING BLADES NOT ONLY INCREASES CUTTING EFFICIENCY BUT EFFECTS GREAT SAVING IN BLADES AS WELL.

Industrial Engineering Co., Inc.
141 W. Jackson Blvd.

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ILLINOIS



•NEW ABRASIVE BAND GRINDER...

"Built Like a Machine Tool"

The Hormel-M Grinder is sturdy built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout. Equipped with ALEMITE LUBRICATION complete with grease gun.

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this and other styles and sizes.

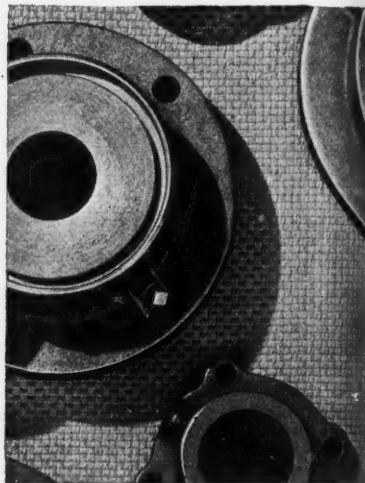
HORMEL-M GRINDER

WALLS SALES CORP.
96 WARREN ST. NEW YORK, N. Y.

than 18-4-1, a feature which is said to contribute to greater economy in heat treating, and is lighter in weight.

R-S Standard Covers for Ball and Roller Bearings

A line of standard covers for ball and roller bearings is now being marketed by R-S Products Corp., 4530 German-



R-S Standard Covers for Ball and Roller Bearings

town Ave., Philadelphia, Pa. These covers are designed to make bearing housings dust and grease-tight and are available in a wide range of types and sizes.

G-E Flamenol Bus-drop Cable

A non-rubber flexible Flamenol Bus-drop Cable for 600-volt branch circuits has been announced by the Wire and Cable Division of the General Electric Co., Schenectady, N. Y. By means of the cable, connection from bus bar to machine can be readily and economically made. Besides using no rubber, the cable requires no conduit, thereby saving steel.

According to the manufacturer, the G-E Flamenol Bus-drop Cable is highly resistant to oils, acids, alkalies, and coolants and will not support flame. In addition,

EKLIND UNIVERSAL MILLING HEAD

SELF-CONTAINED.
ADAPTABLE
TO ANY
MACHINE

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Mills
Drills
Bores
At Any Angle

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SPEEDS
FROM
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A ROUGH TOUGH JOB

Made
Easy
WITH

BISCO TOOL STEEL
T U B I N G



• Five sections of 7" BISCO Tool Steel Tubing are used in the above die to stamp out circles of sandpaper. In spite of constant abrasive action, BISCO tubes offer rugged resistance.

No time or money are wasted on costly boring operations with BISCO Tubing. We cut it to any size from our warehouse stock and deliver it ready for use.

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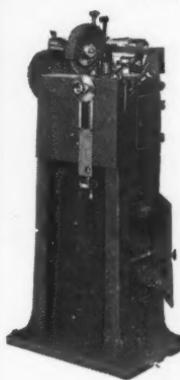
THE BISSETT STEEL CO.

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Automatic Metal Saw Grinder and Rettother

MODEL 1C

PRECISION
and
ACCURACY
AUTOMATICALLY
ASSURED



For metal cutting saws 2" to 14" in dia. When specified, saws as small as $\frac{3}{4}$ " dia. and $\frac{1}{8}$ " to 2" spacing. Also supplied as a Combination Grinder for circular, band and hack saws.

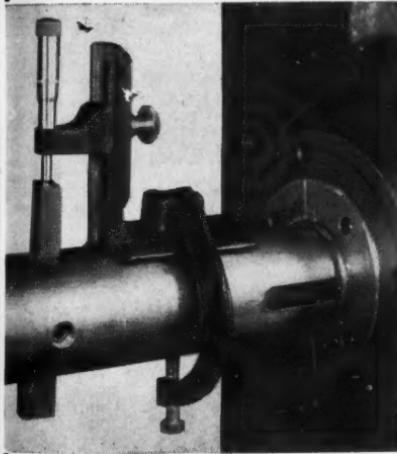
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The Wardwell Mfg. Co.

3166 Fulton Rd.

Cleveland, Ohio

FOR SPEEDY, ACCURATE SETTING OF BORING TOOLS



The Bartelt Tool Setting Gage provides speedy, accurate setting of boring tools as well as many other tool setting and related applications. The gage may be had with either a micrometer or a dial indicator for exact tool setting. After the tool is clamped on the boring bar, use the slide to bring the micrometer down to the cutter, then back up the micrometer the number of thousandths required to bore to size, set the cutter, remove the gage and proceed with the work. Write today for further information.

BARTELT ENGINEERING COMPANY
1214 PARTRIDGE AVENUE

BELoit, WISCONSIN

it is easy to handle, easy to bend, and is said to be resistant to abrasion.

The conductors of the cable are soft-



Section of G-E Flamenol Bus-drop Cable with insulation removed from one end

drawn dry-bright-annealed stranded copper, the strands being protected by a coat-

ing of tin or other suitable material. Each conductor is insulated with the same synthetic as that used on G-E Flamenol Wire, the thickness of the insulation being in accordance with A.S.T.M. Specification D-27. For quick identification, the conductors are insulated in red, white, and black.

Ground wires conform to the same electrical and physical properties as the conductors and are provided with green braids of cotton. The aggregate area of the ground wires is equal to the circular-mill area of one of the main conductors. The three insulated conductors are twisted together with the ground wires, in combination with dry jute in each interstice, to form a hard, compact core, over which is applied a tape and jacket overall of the same synthetic insulation as that used on the conductors.

U. S. HEADS

STANDARD SINCE 1915



Two Spindle Head
Both Spindles
Adjustable

The United States Drill Head Co.

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CINCINNATI, OHIO

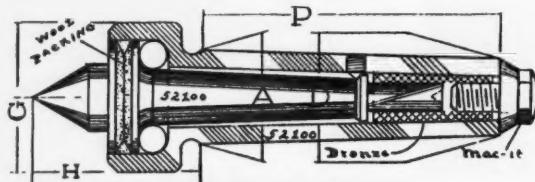
Griffin Metal-Cutting Band Saws

A line of Griffin Metal-Cutting Band Saws in which the teeth only are hardened is now being marketed by John H. Graham & Co., Inc., 105 Duane St., New York, N. Y. Due to the special steel and heat-treatment employed in the manufacture, these saws are said to provide a maximum in cutting service under various speeds and feeds.

All Griffin Metal-Cutting Band Saws have raker set teeth and one standard temper. The saws are available in lengths ready for use of from 5 feet inches to 21 feet 5 inches inclusive, and width and thicknesses of from $\frac{1}{2}$ to 0.025 inch to 1×0.035 inch.

Smooth-On No. 7B Quick Patch Cement

A cement for use in the quick patching of cracks, ruts, and shallow holes in con-



IF THE Rigid Center is Not the Best. Get the other.

RIGID TOOL CO.

• 2010 Witherell St., Detroit, Michigan

Vernon 6" UNIVERSAL INDEX CENTERS



Head swivels and locks from 10° below horizontal to 10° past perpendicular. Spindle taper #9B&S. The 3 index plates provided will divide all numbers to

50 and all even numbers to 100 (except 96T).

Write for bulletin.

MACHINERY MANUFACTURING COMPANY
1415 JESUP ST., PHILADELPHIA, PA.
Vernon Line of
HORIZONTAL MILLS, VERTICAL MILLS and
JIG BOARDS, SHAPERS and GRINDERS

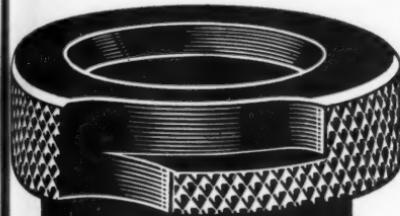


M-D Facing Heads With Automatic Feed

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

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120 PHILADELPHIA ST. HANOVER, PA.



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Write for Specification
Sheets and Prices . . .

COLONIAL BUSHINGS, Inc.
145 Jos. Campau St., Detroit

COLONIAL
DRILL JIG BUSHINGS

Things to remember in power metal sawing!



Always follow these simple rules
—to speed work and conserve the
VICTOR Hack Saw Blades you buy:

Take time to select and set up the right
blade for the job.

Follow the "three-tooth rule."

Use blades with finer teeth on hard stock
and thin sections.

Be sure teeth point in right direction.
Keep blade tight; tighten it after first
few strokes.

Use a lubricant, except on cast iron, cop-
per and brass.

Don't use too much lubricant; steam is
not a bad sign.

Heat softens teeth and speed makes heat.
Keep speed slow, especially on hard stock.
Except on soft or very thin-walled sec-
tions, apply all the pressure the teeth
will stand without breaking off. As teeth
show signs of dulling, increase pressure.

Don't waste time and power on worn
blades. When in doubt, replace.

Don't use a new blade in a half-finished
cut. Turn over the work.

These helpful hints—and scores more like
them—are printed and illustrated in
"Metal Cutting," free 20-page VICTOR
booklet. It's yours for the coupon below.



Victor Saw Works, Inc., Middletown, N. Y.
Please send immediately _____ copies of
"Metal Cutting"—FREE.
Name _____ Address _____

crete floors, to be known as Smooth-On No. 7B Quick Patch Cement, has been placed on the market by Smooth-On Mfg. Co., Dept 437, 570 Communipaw Ave., Jersey City, N. J. The material is said to harden quickly and adhere firmly to the surfaces to which it is applied.

According to the manufacturer, Smooth-On No. 7B Quick Patch Cement has an iron base, thereby making it extremely wear-resistant as well as dustproof, oil-proof, and waterproof. Patches of the material are said to harden overnight, permitting full traffic the following morning, and become stronger with age.



- ◀ Special Anti-Mushrooming
Anti-Chipping Heat-Treat
- ◀ Oversize Shanks
- ◀ Exclusive Knurled Back
- ◀ Exclusive Thumb Grip
- ◀ Broach-Rounded Corners

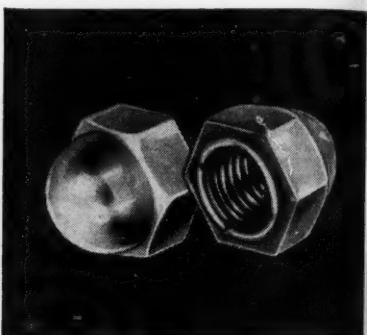
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Engineering Service
on Marking Devices**

Write for Price and Data
Bulletin No. 113-12

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit

An-cor-lox Cap Shape Lock Nuts

An-cor-lox Lock Nuts in cap (acorn) shapes are now being manufactured by the An-cor-lox Division of Laminated



An-cor-lox Cap Shape Lock Nuts

Shim Co., Inc., Glenbrook, Conn. The nuts are available with body of range of materials and locking ring insert of various metallic composition, and can be obtained in all standard sizes, with thick or thin walls.

The An-cor-lox Cap Shape Lock Nuts are completely self-contained, the locking ring being made integral with the nut body, thus comprising a single unit lock nut notable for its quick, easy handling.

Brightboy Finetex Abrasive Wheel

The Weldon Roberts Rubber Co., Brightboy Industrial Division, Newark, N. J., announces the addition of a fine texture wheel to its Brightboy line of rubber-cushioned abrasive products.

**"OUTWEARS
the best
Bronze Metal"**

20 years ARGUTO without
K K a drink

ARGUTO OILLESS BEARING CO.

Wayne Junction, Philadelphia, Pa.

Nuts
acorn
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"MOLD YOUR OWN" LEAD HAMMERS

with this Lead Hammer Mold. Casts hammer heads over pipe, or "Shur-Grip" malleable iron handles.

Johnson Tool Co., Inc.

Massasoit Ave.,
E. Providence,
Rhode Island

Also: Bench
Vise Jaw Mold
—for lead vise
Jaws.



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Write for
Circulars
and Prices
Lead
Hammers—
all sizes
in stock.

THE PRECISION UNIVERSAL TOOL HEAD

ADJUSTABLE While Running!



Absolutely Different

brings all adjustments under absolute micrometric control of the operator without stopping tool or machine. In Jig Borer, Milling Machines or Horizontal Boring Mill, it bores, faces, counterbores, turns outside diameters, mills flat surfaces and slots, undercuts, recesses, back-faces and does an almost limitless range of "headline" jobs. Send for bulletins. Address all communications, inquiries and orders to

THE PRECISION TOOL CO., INC.
P. O. BOX 155, BROOKLYN, NEW YORK
Code Address: "Precision-New York" Tel: Miles 4-1864

SPEED with SAFETY on MACHINE REPAIRS

CAPACITIES
5 TO 50 TONS

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The easy, safe, quick way to remove and replace wheels, gears, bearings, shafts, sleeves, pulleys, etc.

The OTC PULLING SYSTEM includes Pullers and Pushers for every need.

OTC GRIPOMATIC PULLERS

have a patented grip which prevents slipping, avoids damage to costly parts, reduces accidents. Designed to facilitate working in close quarters.

SPECIAL PULLERS
and other industrial tools designed and built for special needs.

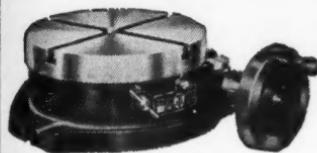


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PLANT MAINTEN-
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No. PE-1520.

OWATONNA TOOL CO.

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OWATONNA, MINN.



BRAND NEW PRECISION ROTARY TABLES

FAST DELIVERY GUARANTEED

Our rotary table will take the place of a costly fixture. It is used for all kinds of work on milling machines, shapers, drill presses and horizontal boring mills.

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WE CAN ALSO FURNISH DIVIDING
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Brightboy Finetex Abrasive Wheel

use in metal finishing operations. The wheel, which is known as the Brightboy Finetex, is said to be especially adapted for the more delicate type of work in producing special finishes and polishes.

The Brightboy Finetex Abrasive Wheel is available in small sizes of from $\frac{1}{4}$ to 1 inch in diameter and in large sizes of from $1\frac{1}{2}$ to 5 inches in diameter.



DRILL THESE HOLES

By a Quick, Easy, Inexpensive Method
Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

Pulmosan Magout Powder

A powder for quickly extinguishing magnesium fires, to be known as Magout Powder, has been developed by the Pulmosan Safety Equipment Co., 111 Johnson St., Brooklyn, N. Y. Magout is a non-absorbent finely pulverized dry powder which is said to be safe to handle and easy to use, and is designed to instantly smother fires caused by magnesium shavings in machine shops or by magnesium incendiary bombs.

Magout Powder is available in either bulk quantities or in handy instant-action tubes for sprinkling on fires. These cardboard tubes have metallic ends, and are lined with paraffin.

Tool Steel Chart

To assist buyers and users of tool steel to make comparisons between the different kinds and types of tool steel in order to select the type which best suits the purpose of the user, Gideon Kane, Box 581, Green Bay, Wis., has developed a Tool Steel Chart upon which is listed the different kinds and types of high speed steels, alloy tool steels, and carbon tool steels made by 24 different American tool steel manufacturers. The classifications list 24 different types of steels and the chart indicates which steels, identifying the steel by name or number, fall into each classification. Thus the customer can tell from a glance at the chart which steels have comparable characteristics.

The Class A and Class B high speed steels are listed by numbers indicating the composition, such as "18-4-1" and so on. Alloy tool steels are listed in columns indicating the characteristics of the steels such as "Tungsten Heat Work," "Finishing Steel," "Oil Hard Non-Shrink" and so on. Carbon tool steels are listed as Grade A, Grade B or Grade C.



KUTMORE ADJUSTABLE HIGH SPEED HOLLOW MILLS

16 standard sizes—Cutting capacities $1/32$ " to 2". Also special made to order.

The KUTMORE is the only hollow mill with built-in micrometer dial adjustment. Prompt delivery—even on specials. Write for Catalog No. 15.

CARL WIRTH & SON, 1625 Clinton Ave., N.

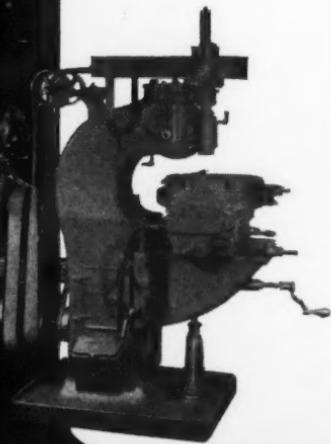
Rochester, N. Y.

Berkeley Drives

Put that old machine to work—modernize it with a Berkeley Drive.

There is no machine in your plant that we cannot efficiently motorize. We manufacture V-Belt—Helical Gear—Variable Speed (P.O.S.) or quick change gear drives. Each drive is custom built for your particular machine.

Write for details.



THE BERKELEY EQUIPMENT CO.
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**FREE
VALUABLE REFERENCE**



**DON'T GUESS ABOUT
SPROCKETS**

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"Ply-Rustex" Rust Prevention Cream

The Milburn Co., Detroit, Mich., is now marketing a rust prevention material in the form of a cream which can be applied to the hands of a workman before contact with highly polished metal surfaces. The material, which is known as "Ply-Rustex," is designed to eliminate perspiration corrosion and other forms of rusting caused by the handling of metals during machining and processing operations.

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the cream to his hands before touching any part of the article to be machined or processed. This enables the worker to freely handle the metal part throughout the machining operation without gloves, since Ply-Rustex forms an invisible film on the skin which is said to be inert with respect to chemicals, oils, cutting compounds, and other materials that may be a part of the particular industrial process.

According to the manufacturer, Ply-Rustex is non-toxic and positively harmless to the skin. It can be easily applied similar to a vanishing cream and removed with equal facility. Moreover, since it forms an impervious protective coating, the material is said to prevent irritations that may result in many forms of industrial skin disorders or dermatoses.

Johnson Special Solder

A special solder designed for the soldering of all hard-to-solder metals such as aluminum, aluminum alloys, die-cast metals, Dowmetal, Almico, and so on, has been placed on the market by the Lloyd S. Johnson Co., 2241 Indiana Ave., Chicago, Ill. The material is said to be exceptionally free-flowing and provides unusual tensile strength in sheet metals and extruded aluminum. According to the manufacturer, the solder retains the color of aluminum and Dowmetal, and is corrosion resistant.

Johnson Special Solder is supplied conveniently rolled $\frac{1}{8}$ inch square, and runs approximately 270 inches to the pound.

"The Di-Aero System of Metal Duplicating Without Dies"—an original process for duplicate forming of parts or pieces to die accuracy using Di-Aero precision machines, individually and in connection with each other—is the subject of a 32-page catalog prepared by the O'Neil-Irwin Mfg. Co., Minneapolis, Minn. Treated in the catalog are the development of the Di-Aero system, the Di-Aero Bender No. 1, Di-Aero Brake No. 1, and Di-Aero Shear No. 1 and parts made with each, Di-Aero Bender No. 2, Di-Aero Brake No. 2, applications of Di-Aero machines by companies, typical users of Di-Aero machines, questions and answers about Di-Aero units, and so on. Copy of catalog free upon request.

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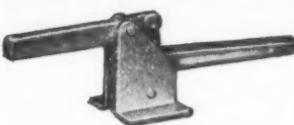
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New Books

Machine Shop Work. By John T. Shuman, Coordinator, Williamsport Technical Institute, Williamsport, Pa. Published by American Technical Society, Drexel Ave. at 58th St., Chicago, Ill. 499 pages, 572 illustrations, 49 tables. Cloth binding, board covers. Price, \$3.50.

Written in an unusually clear and easy-to-understand manner, this book is intended to help the beginner obtain a better understanding of the funda-

mentals and principles of modern machine shop practice. The book is written on the basis that consistent progress in machine shop work cannot be made unless the student or worker understands the principles underlying the use of the various tools and machines common to a modern shop. Emphasis is placed on the fundamentals behind the tools of the trade, with special attention given to the operation of the standard machine tools.

Several helpful features in the book are unique. One of these is the "trouble-shooting" page at the end of each of the chapters on machine tool operation. On each trouble-shooting page, the most common operating difficulties encountered on each particular machine are tabulated with a discussion of the probable cause and suggested remedy for each difficulty. These pages are especially helpful to the learner.

Quiz questions are listed at the end of each chapter or section. In addition to the usual type of question list, sets of questions with correct answers are used for quick, thorough reviews and summaries. These questions should prove of great value to the worker and student.



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Cutting Tools for Metal Machining
By Max Kurrein and F. C. Lea. Published by J. B. Lippincott Co., 227 & 6th St., Philadelphia, Pa. 219 pages 6 x 9 inches. 308 illustrations, 23 tables. Cloth binding, board covers. Price, \$6.00.

"Cutting Tools for Metal Machining" is an informative book which describes how outstanding results can be obtained from any machining operation. The book is designed to keep in view certain essentials, particularly the cutting angles of tools, to show how for given materials these should be practically the same whatever the tool and to indicate how in the light of scientific tests and experience the best results can be obtained from any machining operation.

Contents of the book are as follows: Elements of the Tool; Materials for Tools; Classification of Cutting Tools; Turning and Boring Tools; Drilling Tools; Counterbores; Reamers; Threading Tools; Milling Cutters I; Milling Cutters II; Straight Line Cuts; Tool Grinding; Grinding and Grinding Machines; Tool Hardening.

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Run a Lathe" — for defense training purposes, the South Bend Lathe Works has issued the 41st edition of this popular book. A number of changes in text material and illustrations have been made since the previous edition was printed in 1941.

The book contains up-to-date information on the operation and care of screw cutting lathes. It covers such subjects as the History and Development of the Screw Cutting Lathe; Setting Up and Leveling the Lathe; Operation of the Lathe; Lathe Tools and Their Application; How to Take Accu-

rate Measurements; Plain Turning; Chuck Work; Taper Turning and Boring; Drilling, Reaming and Tapping; Cutting Screw Threads; and Special Classes of Work.

Written in a clear and concise manner, this edition contains 128 pages, 5½ x 8 inches in size, and over 365 illustrations. Copies are available for 25c postpaid upon request to the South Bend Lathe Works, Dept. 4Z, South Bend, Indiana.

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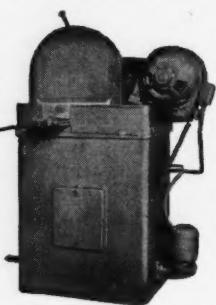
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Detroit Die Sets and Die-makers' Supplies, products of the Detroit Die Set Corp., 2897 W. Grand Blvd., Detroit, Mich., are fully described and completely cataloged in the fifth edition of this company's trade booklet now available free upon request. Standard, long narrow, standard reverse, round and back post, high production heavy duty, high production heavy duty reverse, and large two post and four post sets of semi-steel are covered. Steel sets include standard, long narrow, standard reverse, round and back post, three post and large two and four post sets. Also listed are leader pins, bushings, shoulder pins, steel punch shanks, dowel pins, die springs, socket head cap and set screws and stripper bolts, steel bolster stripper and pressure plates, and toggle clamps.

Coffing Model Y-C Spur-Geared Chain Hoist. Coffing Hoist Co., Danville, Ill., now has available a four-page folder illustrating and describing an improved ball bearing spur-geared chain hoist.

Arcos Technical Bulletin No. 5. Arcos Corp., 401 N. Broad St., Philadelphia, Pa., is now issuing a bulletin featuring discussions on welding with Arcos Chromend Electrodes of the chromium-nickel type and the manipulation of Arcos Chromend HCN Electrode for welding heavy sections of air hardening steels. Also included in the bulletin are tables giving current values, weld metal characteristics, deposition data, heat treatment, and applications of Arcos Stainless and Alloy Electrodes. Copy of Arcos Technical Bulletin No. 5 free upon request.

Westcott Chucks. Catalog No. 540 consisting of a series of bulletins containing illustrated, descriptive, and tabular information on various types of Westcott Chucks is now being distributed by the Westcott Chuck Co., 316 E. Walnut St., Oneida, N. Y. Chucks covered include Westcott I. X. L. Independent Lathe Chucks, Universal (Self-Centering) Lathe Chucks, "Oneida" Universal Lathe Chucks, Spur Geared Scroll Combination Lathe Chucks, "Am-Craft" Light Duty Lathe Chucks, and "Little Giant" Double Grip Drill Chucks. Casler Offset Boring Heads

are also covered in the catalog, copy of which is available free upon request.

Michigan Shaping Bulletin GS-42. A 12-page bulletin covering the shaping of involute gears of all types has been published by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich. The bulletin deals with the factors which are directly responsible for satisfactory results from the shaping process.

Included in the bulletin and relating directly to the shaping process are sections headed "Correct Tooth Form," "Mating of Hobbed and Shaped Gears," "Modified Tooth Forms," Possible Machine Errors," "Advantages of Gear Shaping," and "Shaping 'Versus' Hobbing." Relating to cutters used for gear shaping, some of the subjects covered are "Accuracy Required for Shaper Cutters," "Hints on Cutter Sharpening," "Checking Shaper Cutters and Shaped Gears," and a "Nomenclature of Cutters Terms."

The bulletin is illustrated with reproductions of drawings and photographs and includes tables giving permissible limits of eccentricity, tooth spacing, and so on, for roughing, semi-finishing, and finishing cutters of various pitches and pitch diameters. Copy free.

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Majestic Tool & Mfg. Co.
2950 E. Woodbridge Detroit, Mich.

Webber Precision Gage Blocks. Complete information on Webber Precision Gage Blocks is contained in a four-page illustrated folder prepared by the Webber Gage Co., 12899 Triskett Rd., Cleveland, Ohio. Copy free upon request.

Prosser Model E. Heavy Duty Carbide Tool Grinder. A four-page folder describing and illustrating the Prosser Model E Heavy Duty Carbide Tool Grinder for wet or dry grinding of carbide, high speed steel, and Stellite tools is now available from Thomas Prosser & Son, 120 Wall St., New York, N. Y., free upon request.

Challenge Precision Equipment. A 12-page catalog of precision equipment for tool and machine industries has been published by The Challenge Machinery Co., Grand Haven, Mich. The catalog includes illustrations and descriptions, as well as specifications, on the Challenge line of lapping plates, layout surface plates, bench plates, work-benches, surface plates, straight edges, parallel blocks, angle plates, V-blocks, and cut-off machines. Copy free upon request.

"Airco . . . in the News," Vol. 2, No. 2. Published by Air Reduction, 60 E. 42nd St., New York, N. Y., this edition describes and profusely illustrates the application of Airco electric arc welding equipment and gas welding and cutting equipment in the construction of various aircraft parts, buses, tanks, trimming the flanges of ship beams, repairing corroded girders, and so on. Copy free upon request.

"The Care and Maintenance of Diamond Tools" is the title of a 24-page illustrated booklet now being issued by J. K. Smit & Sons, Inc., 157 Chamber St., New York, N. Y., containing helpful data regarding these tools and the application in truing and dressing abrasive wheels. Copy free upon request.

Counting, Timing and Recording Devices. The Production Instrument Co., 702-12 W. Jackson Blvd., Chicago, Ill., announces a 50-page catalog on counting, timing, and recording devices. Illustrated and described are mechanical and electrical counters, predetermined electric counters, and high speed or winding counters. Also described are actuating switches for electric counters together with numerous applications of photoelectric counting, signal-graph automatic timing and recording devices and time totalizers, which measure and record the total operating time of alternating current circuits. Copy of Catalog 42 free upon request.

Lehmann Optical Grinding and Polishing Machines. The George Schenck Co., Inc., 130 Lafayette St., New York, N. Y., is now issuing a four-page bulletin fully describing its line of Lehmann Optical Grinding and Polishing Machines. Copy free upon request.

"Coolant Pumps by Warren" is the title of a four-page bulletin published by Warren Steam Pump Co., Inc., Warren, Mass., containing a general description, detailed specifications, and performance information on Warren "Coolflo" Coolant Pumps. Copy free upon request.

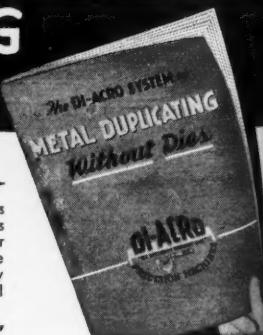
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"Compo" Oil-Retaining Bearing Installation Data Bulletin. An eight-page bulletin of installation data on "Compo" Oil-Retaining Porous Bronze Bearings, showing most approved methods of installation by means of diagrammatic drawings, and so on, is now being distributed by the Bound Brook Oil-Less Bearing Co., Bound Brook, N. J. The adaptation of "Compo" Bearings to molded rubber, plastics, and die castings is also detailed, together with graphs reflecting essential data on shaft clearances and permissible loads. Copy of bulletin free upon request.

Metc Bulletin 42A. Metallizing Engineering Co., Inc., Long Island City, N. Y., has published a 16-page bulletin describing the metallizing process and equipment for its application. The bulletin tells briefly how industries are eliminating replacements and increasing service life of equipment now difficult to replace by building up worn diameters with any desired wear and corrosion-resistant sprayed metal. The bulletin also indicates how metallizing is used to rapidly salvage mismachined parts and defective castings. Copy free upon request.

Electric Strain Gage Descriptive Bulletin. An eight-page booklet (GEA-3673) recently issued by General Electric Company, Schenectady, N. Y., describes electric gages available for measuring mechanical strains. In an interesting and easily understandable manner, this well-illustrated booklet describes the different types of gages available and discusses their operation.

Stating that the field of application for strain-gage equipment is almost unlimited, the descriptive bulletin goes on to list a few examples of types of stress investigations that can be made. Included among these are the determination of stresses on bridges, tanks, and structural parts; stresses in the rails of railroad tracks; housings of rolling mills; locomotive running gear; beams of shovels and cranes; aircraft structures while in flight; ship hulls and structures; frames of trucks and automobiles.

The gage is also used for indicating peak stress in connecting rods of large punch presses and press brakes; for indicating the maximum permissible load on the rolls of roll-bending machinery; and for the determination of stresses in gun carriages caused by gun recoil. Copy free upon request.

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Prosser Model AA Carbide Tool Grinder for grinding carbide, high speed steel, Stellite, and other modern cutting tools is the subject of a four-page folder prepared by Thomas Prosser & Son, 120 Wall St., New York, N. Y. Copy free upon request.

Eureka Tool Steel Welding Rods. A 16-page catalog containing complete information on the line of Eureka Tool Steel Welding Rods for electric arc, atomic-hydrogen, and oxyacetylene welding which is now being manufactured by the Welding Equipment & Supply Co., 223 Leib St., Detroit, Mich., has been published by this firm. Copy free upon request.

L & R Industrial Cleaning Machines and Cleaning and Rinsing Solutions. An eight-page booklet illustrating and describing the precision cleaning of instruments, meters, gages, bearings, clocks, and related precision mechanisms by means of L & R Industrial Cleaning Machines and Cleaning and Rinsing Solutions has been prepared by the L & R Mfg. Co., 54 Clinton St., Newark, N. J. Copy free upon request.



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Lester-Phoenix Die Casting Machines An eight-page bulletin, together with a specification sheet, covering a complete line of Lester-Phoenix Die Casting Machines for zinc, tin, aluminum, brass and magnesium has been prepared by The Phoenix Machine Co., 2701 Church Ave., Cleveland, Ohio. Copy free upon request.

The Hevi Duty Carburizer. An enlarged and completely revised bulletin on the Hevi Duty Carburizer is now being distributed by the Hevi Duty Electric Co., Milwaukee, Wis. Designated as the HD-142, this 24-page bulletin covers in detail, the construction, operation, application, features and advantages of the unit. Complete specifications are also included in the bulletin, copy of which is available free upon request.

"Tru-Line Principle." A broadside featuring what is said to be an entirely new principle in wheel dressing, known as the "Tru-Line Principle," is now being offered by the Wheel Trueing Tool Co., Inc., 3200 W. Davison Ave., Detroit, Mich. The broadside also contains complete descriptions of the company's line of standard, special feature, thread dressing, turning and boring, radius forming, and gage tools and its special design of core bit. Copy free upon request.

Burgess Model No. 210 Acousti-Beed for all types of industrial plants is the subject of an illustrated and descriptive four-page bulletin released by the Burgess Battery Co., Acoustic Division 536 W. Huron St., Chicago, Ill. Copy Bulletin 144 free upon request.



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Norton Type D Roll Grinding Machine is the subject of a 16-page catalog now being issued by Norton Company, Worcester, Mass. The Type D roll grinding machine is built in 20, 24, 28, 32 and 36-in. sizes, each size equipped with a traversing work table. Specifications for the various sizes of the Type D machine are given in the catalog. Copy free upon request.

G-E Weld Recorder. The G-E Weld Recorder, a recording instrument, signaling device, and lockout control that indicates on a paper chart the variations of the electrical input for a spot weld as compared with other welds and as compared with a predetermined normal, is described in an eight-page bulletin released by the General Electric Co., Schenectady, N. Y. Construction features of the weld recorder are illustrated and discussed in detail. Copy of Bulletin GEA-3313 free upon request.

American Cyclone Dust Collector Catalog No. 82. Complete information on the American High Efficiency Cyclone Dust Collector is contained in an 8 1/2 x 11-inch spiral bound catalog published by the American Foundry Equipment Co., 555 S. Brykit St., Mishawaka, Ind. Profusely illustrated, the catalog clearly shows all of the mechanical features and specifications of the collector and thoroughly explains the construction and operating details.

Also included in the catalog is a section containing essential data for efficient operation of a dust control system, technical layouts, and engineering tables and charts, especially useful in planning applications of dust control units. Copy of Catalog No. 82 free upon request.

Campbell No. 303 Abrasive Cutting Machine Catalog. This catalog, published by Andrew C. Campbell Division of American Chain & Cable Co., Inc., Bridgeport, Conn., contains information regarding the solution to various types of unusual cutting problems such as cutting slots in hardened tubular valves, cutting of large forged sections, production cutting on irregular workpieces, and so on. Large-size illustrations of machine set-ups and special jobs, concise descriptions, and complete specifications are included. Copy free upon request.

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The Heald Herald No. 54. This edition of The Heald Herald, publication of The Heald Machine Tool Co., Worcester, Mass., contains illustrated and informative articles regarding the finishing of connecting rods in a Diesel engine plant on Heald machines, the grinding of straight and taper bores in one setting, and the grinding of bores of internal gears. The use of Heald Bore-Matics in the air-conditioning industry is also discussed. Copy free upon request.

Shaw-Box Hand-Operated Cranes. Shaw-Box Type BR hand-operated cranes, Type SBR and "Push" Type single girder crane bridges, Type SUH single girder underhung crane bridges, swinging bracket jib cranes, and Type SSJ jib cranes are illustrated and described in Catalog No. 203 issued by the Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore, Inc., 440 Broadway, Muskegon, Mich. Outline dimensions for determining how the various types of hand-operated cranes listed above can be applied to existing conditions or installed in new projects are given. Copy free upon request.

"The 200-Ampere Multi-Arc Welding Service" is the title of Bulletin W-26 distributed by Harnischfeger Corporation, 4533 W. National Ave., Milwaukee, Wis., to acquaint the trade with the features of the P&H-Hansen Model WA-200 Arc Welder. The bulletin illustrates the compactness of the WA-200 and illustrates graphically how its requirements of less than $3\frac{1}{2}$ sq. ft. of floor space may be used to advantage by users of welding generators. A complete description of the WA-200 in parallel hook-up for multi-arc welding service is given, showing how units may be installed in "banks," one on the other, to utilize floor space to best advantage and to provide welding amperages in all combinations necessary for obtaining the proper welding heat.

An explanation is included covering the P&H multiple-shifter, a mechanical device which operates the current setting indicator in tandem on two or more units when hooked in parallel. Bulletin W-26 also contains a complete exposition of the characteristics of P&H-Hansen single current control. Copy free upon request.

Congress Drives No. 139. An eight-page catalog covering the complete line of V-belt pulleys and flexible couplings manufactured by the Congress Tool & Die Co., 9030 Lumpkin Ave., Detroit, Mich., has been issued by this firm. Congress crown face, cone, and variable speed pulleys are also described and engineering data and general information included. Copy free upon request.

Stressproof No. 2 Cold Finished Bar Steel. In this eight-page booklet, La Salle Steel Company, P. O. Box 6800, Chicago, Ill., presents the features and advantages of Stressproof No. 2 Cold Finished Steel Bars, and explains their applications in various types of manufacturing plants. Several production reports on actual jobs where Stressproof No. 2 was used add interest to the booklet. Copy free upon request.

"Lithco" and "Lithcarb" Principles and Data. The Lithium Corp., Raymond-Commerce Bldg., Newark, N. J., is now issuing an eight-page bulletin covering a chemically-neutral heat-treating process

known as "Lithco" and a process for fast, bright gas-carburizing designated as "Lithcarb." Copy free upon request.

DoAll Contour Machine Brochure. A spiral bound brochure recently published by Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis, Minn., is directed especially to trade and vocational schools, training centers, and N. Y. A. headquarters. The DoAll Contour metal shaping machines manufactured by this firm are frequently used as basic training equipment for apprentices who are being taught essential machining methods so that they may take their needed place in defense industries.

The brochure contains specification sheets on the various DoAll machines, illustrations of the equipment, and a selection of interesting letters from users of these machines, emphasizing the importance of the DoAll machines as basic machine shop equipment. Persons engaged in training programs will find the material contained in the brochure extremely helpful and instructive. Copy free upon request.

GRAND RAPIDS Combination Tap and Drill Grinder MOTOR DRIVEN



**SHARPENS TAPS
2-3-4 Flute, Right or Left Hand.**

**SHARPENS DRILLS
2 or 3 Flute, Straight or Taper Shank.**

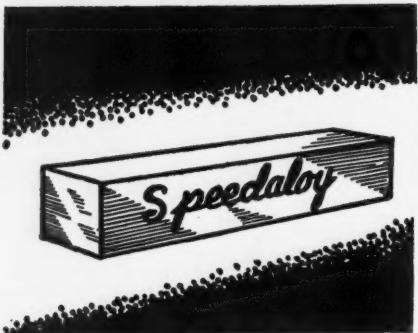
**Grinds DRILLS $\frac{1}{8}$ " to $1\frac{1}{2}$ "
and TAPS from No. 6 to
 $1\frac{1}{2}$ ".**

**Other Combinations also
available.**

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336 STRAIGHT AVE., S. W. • GRAND RAPIDS, MICH.**

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SPEED UP
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TOOL BITS AND TIPPED TOOLS**



SPEEDALOY

- SPEEDS UP PRODUCTION 50 to 150%
- SPEEDS UP CUTTING OPERATIONS
- SPEEDS UP COST SAVINGS
- SPEEDS AWAY TIME LOSSES

WHAT IT IS

SPEEDALOY is a cast, cutting material made up of special tungsten chromium alloy. It fills the breach between high speed steels and tungsten carbides in both performance and price.

WHAT IT DOES

SPEEDALOY wears longer than high speed steel and resists shock more than tungsten carbides. It will machine all materials except manganese steel and chilled iron. It should be run faster with about the same depth of cut and feed as high speed steel — thus increasing production 25 to 75%.

SPEEDALOY has proven exceptionally effective on stainless and other nickel or chrome alloy steels.

SPEEDALOY can be supplied in tool bits, flats, and a wide variety of tipped tools available for immediate delivery.

Literature on request.

CIRCLE TIP



TOOL CO., Inc.

EAST ORANGE

NEW JERSEY

The "Frostrode" Process of Refrigerated Welding, through which welding electrodes are so cooled as to be continually covered with frost, is described in a four-page bulletin issued by the Frostrode Division of Weltronic Corp., 3080 E. Outer Drive, Detroit, Mich. Copy of Bulletin R-42 free upon request.

Johnson Bronze General Catalog No. 410. The Johnson Bronze Co., 590 S. Mill St., New Castle, Pa., is now issuing a 1941 illustrated catalog on stock sizes of bearing bronze. Believed to be the most complete book of its kind ever published, this 76-page catalog lists and describes Johnson General Purpose Bronze Bearings and Bushings, Flanged Bearings and Bushings, Universal Bronze Bars, Graphited Bronze Bearings, Electric Motor Bearings, Babbitt Metal, and "Ledaloy" Self-Lubricating Bearings. The catalog also contains application data as well as a table of decimal equivalents.

Included with Catalog No. 410 is a 24-page comprehensive price list on Johnson "Quality" Bearing Bronze. Copy of catalog together with price list free to anyone addressing a request on his company letterhead.

"The ABC and XYZ of Cleaning, Hardening, Surfacing, Relieving Metal Fatigue, Strain, etc., etc.," is the title of a 24-page interesting booklet issued by The National Metal Abrasive Co., 3560 Norton Rd., Cleveland, Ohio. The booklet treats rather extensively on Abrasives of Yesterday and Those of Today; Types of Abrasives; Differences in Action Between Shot and Grit; Sand or Flint as an Abrasive as Compared With Steel Abrasives; Great Potential Opportunities Afforded by "Controlled Abrasives"; Definite Characteristics to Consider When Buying Abrasives; Size of Shot and Grit; How to Figure the Price of the Abrasive You Buy; Crater—Caused by Peening Action of Shot; Troubles and Their Cures; Removing Fatigue Resistance of Steel by Steel Abrasives, and What You Obtain by Ordering, Specifying, and Using National Controlled Abrasives.

The booklet is illustrated and contains tables and charts. Copy free to anyone addressing a request on his company letterhead.

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Fansteel Tantung Grade "G." Two folders covering Fansteel Tantung Grade "G" General Purpose Cutting Tools are announced by the Fansteel Metallurgical Corp., North Chicago, Ill. Copies free upon request.

Truflo Wall Fans are covered in detail in a four-page bulletin released by the Truflo Fan Co., 536 Main St., Harmony, Pa. Truflo Pent House and Roof Ventilating Fans are also illustrated and described. Copy of Bulletin No. 240 free upon request.

Standard Bulletin No. 38-A. An infinitely variable speed buffing and polishing machine recently developed by the Standard Electrical Tool Co., 8th and Evans Sts., Cincinnati, Ohio, is fully illustrated and described in Bulletin No. 38-A now available for distribution. A speed changer which makes it possible to obtain any spindle speed from 1,000 to 3,500 r.p.m. merely by turning a handwheel is incorporated in the machine. Copy free upon request.

Roto-Clone Dust Control is the subject of a 16-page bulletin which is now being distributed by the American Air Filter Co., Inc., Dept. 694, Louisville, Ky. The bulletin includes numerous installation photographs showing how AAF Roto-Clone Dust Control Systems have provided a simple and satisfactory solution to a wide variety of dust problems. Copy of Bulletin No. 270 free upon request.

Gisholt Balancing Machines Booklet. A line of static and dynamic balancing machines for locating and measuring unbalance in rotating parts is announced in a 32-page booklet released by the Gisholt Machine Co., 1219 E. Washington Ave., Madison, Wis. Detailed explanations of the effects of unbalance in rotating parts are given, and diagrams and descriptions of the underlying principles of the modern methods of correction as employed by the Gisholt machines are included. Illustrations and typical installation views of each type of static and dynamic balancing machine are also presented in the booklet. Copy of booklet is available to any mechanical executive who will address a request on his company letterhead.

NEW

GRIFFIN

BAND SAWS

Made by **G. W. GRIFFIN CO., Franklin, N. H.**

These blades are similar to the GRIFFIN Soft Back Hack Saw Blades in that the teeth only are hardened. A special steel and heat treatment enables GRIFFIN BAND SAWS to give the maximum in cutting service under various speeds and feeds. All bands have Raker set teeth and one standard temper.

They are furnished in coils or cut to length, welded and ready for use.

JOHN H. GRAHAM & CO. INC.
GENERAL SALES AGENT

105 Duane Street • New York City



Cincinnati 10-Inch Plain Hydraulic Grinding Machines. A 20-page catalog containing illustrations, a description, and complete specifications of Cincinnati 10-inch Plain Hydraulic Grinding Machines has been prepared by Cincinnati Grinders Inc., Cincinnati, Ohio. Copy of Catalog G-490 free upon request.

"How to Speed Up Production with Variable Speed Control." Released by the Reeves Pulley Co., Columbus, Ind., this 24-page booklet cites 36 specific examples in all types of industrial plants in which speed control made possible definite production increases and advantages. In addition to the production case histories, the booklet also includes illustrations and descriptions of the three Reeves speed control units, together with the many different designs and controls available, and a list of Reeves engineering representatives throughout the world.

The booklet, which is designated as Form No. G-412, is available free to any industrial production man upon request.

"A Few Important Suggestions on the Design of Threaded Parts," a data sheet prepared by die head manufacturers, is now being distributed by such manufacturers free upon request.

Detroit Rex Metal Cleaning Leaflet. A brief description of the methods used in solving industrial metal cleaning problems is contained in an illustrated leaflet issued by the Detroit Rex Products Co., 13017 Hillview Ave., Detroit, Mich. The leaflet shows the company's research, engineering, and manufacturing facilities for production of degreasers, washers, and chemical cleaners. Copy free upon request.

Carbolyt Tungsten Carbide Tool Manual GT-133. A manual containing instructional material on virtually every conceivable factor connected with the use of tungsten carbide tools is now available from the Carbolyt Co., Inc., 11143 E. 8 Mile Ave., Detroit, Mich. Not only does the manual cover the design of carbide tools themselves—the selection of tool shapes, tip and shank size, relief angles, and so on—but it also covers such related items as design and setting of toolholders, machine recommendations, toolholder screws, correct methods of using coolants, and so on.

For manufacturers desirous of producing their own tools, the manual provides complete instructions on torch brazing technique, materials, and equipment. Also included in the manual are complete charts of recommended feed speeds, tool angles, and depth of cut for various materials.

Manual GT-133 gives complete instructions for grinding tools, including recommendations as to machines, wheel grinding technique, and the design and grinding of chip breakers for tools used in steel cutting. The manual also contains numerous illustrations of examples of how special tools can be produced from standard tools by simple grinding operations. A summary of various grades of carbides is included to assist tool engineers in selecting the proper grades for different jobs.

In addition to a valuable list of "do's and don'ts" for carbide tools, sketches of handling equipment which has been found helpful in preventing accidental damage to such tools are provided. Also given are suggestions as to the setting up of tool control and handling methods in the shop, with illustrations of tool record cards, and so on. Copy of Manual GT-133 free upon request.



Rotomill Brochure. Complete information regarding the Red Ring Rotomill, product of the National Broach & Machine Co., Shoemaker and St. Jean Sts., Detroit, Mich., is contained in a brochure now being distributed by this firm. This brochure includes several pages which are devoted to illustrating and describing the operation, adjustments and control, cutters, construction, and typical applications of the Red Ring Rotomill. Rotomill specifications are also given. Copy free upon request.

"14 Big Trouble Savers" is the title of a condensed catalog folder issued by the Trico Fuse Mfg. Co., 2948 N. Fifth St., Milwaukee, Wis. The folder contains complete specifications and illustrations of powder-packed renewable fuses, non-renewable fuses, plug fuses, thermal time-lag plug fuses, tamper-resisting plug fuses, clamps for locking fuse clips, heavy duty test clamps, and fuse pullers and automatic lubricators for all types of bearing surfaces. Copy free upon request.

"**Filtaire**" Portable Dust Collector. A four-page illustrated folder covering the features, application, specifications, and so on, of the "Filtaire" Portable Dust Collectors is now being issued by the Edward Blake Co., 634 Commonwealth Ave., Newton Center, Mass. Copy free upon request.

"**Chips**" is the title of a 16-page booklet published by The Operators' Service Bureau, Warner & Swasey Co., Cleveland, O., containing information on how lathe cutting tools can be made to perform efficiently, produce more pieces between grinds, "hog out" greater quantities of metal, turn out heavier chips, and so on. Copy free upon request.

Defense Savings Bonds are now available at more than 16,000 post offices and 9,000 banks throughout the United States.

Rotorex GRINDER
FOR ALL TOOLS
PROMPT DELIVERY
by LARGE SCALE PRODUCTION

DOUGLAS MACHINERY CO.
150 BROADWAY
NEW YORK, N.Y.

Pantograph Engraving Machines. An attractively printed, 20-page catalog which profusely illustrates and describes Pantograph Engraving Machines for use in general engraving, die, mold, or stamp cutting, profiling on flat or curved work, and so on, is now being issued by the George Gorton Machine Co., 1101 13th St., Racine, Wis. Complete specifications for each type of machine listed are given. In addition, attachments available for the various type Pantograph machines are covered. Copy of catalog Form 1580 free upon request.

"Buffalo" Bending Rolls for circular segment and spiral bending of angles, tees, channels, flats, tubes, pipe, squares, rounds, special shapes, and so on, are profusely illustrated and described in a 20-page bulletin now being issued by the Buffalo Forge Co., 333 Broadway, Buffalo, N. Y. An explanation of some recent improvements in the design of these rolls and a full set of capacity tables are among the material contained in the bulletin. Copy of Bulletin No. 352-A free upon request.

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GEARS OF EVERY DESCRIPTION

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Put Colwell
TOOL POST TURRETS
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Saves Time... Saves Money...

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ACCO Chain and Attachments Catalog No. 365. American Chain & Cable Co., Inc., Bridgeport, Conn., is now publishing a catalog on ACCO Welded Chains. A prominent feature of this publication is a two-color, 16-page insert devoted to ACCO Registered Sling Chains and covering the Endweldur Chain—the most recent development in the ACCO welded chain line. Iron crane chain, in both H. B. and Ajax grades, is also described.

Users and specifiers of chain will find the catalog a valuable addition to their reference files, since it shows how to measure chain; gives complete information on finishes—on the metals used in making chain—and contains specification tables of sizes, dimensions, weights, tensile strengths, and safe working loads. The large illustrations and accompanying descriptions simplify the selection of the proper chain for a particular use. In addition to the many different types of welded chains, necessary attachments such as hooks, cold shuts and shackles are illustrated and described.

Copy of Catalog No. 365 will be sent to users and specifiers of welded chain upon request.

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REMEMBER
ROTARY POWER CUTTERS
"Ground from the Solid after Hardening"
DESIGNED AND SERVICED BY
SEVERANCE TOOL COMPANY
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REGRIND TO SAVE TIME



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South Bend Lathe Catalog 100-A. The South Bend Lathe Works, 972 E. Madison St., South Bend, Ind., has issued a general catalog designated as the 100-A which is said to be one of the most complete lathe catalogs ever published. The catalog has 112 pages and contains over 240 illustrations. It shows 50 different sizes and types of South Bend Back-Geared, Screw Cutting Lathes for manufacturing, toolroom, and general shop work.

Sizes of lathes illustrated are 9, 10, 13, 14½, 16, and 16-24-in. swing. Each size is shown in several different models with motor drive and counter-shaft drive, in quick change gear and standard change gear. New items shown in the catalog include the South Bend Model "A" 9-In. Workshop Tool Room Lathe, 10-In. Swing, ½-In. Collet Series "S" Lathes, and 10-In. Swing 1-In. Collet Lathes.

"3-M Products Used in the Victory Program" is the title of a 26-page catalog now being issued by the Minnesota Mining & Mfg. Co., Advertising Department, St. Paul, Minn. The catalog describes and profusely illustrates the use of various 3-M Abrasives and Scotch Tapes in relation to war production. Copy free upon request.

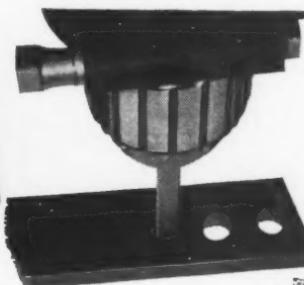
Defense Savings Bonds are now available at more than 16,000 post offices and 9,000 banks throughout the United States.

"Unit Packaging" is the subject of an interesting and informative booklet now being issued by Clark Tractor, Division of Clark Equipment Co., Battle Creek, Mich. Copy free upon request.

Wright Speedway Electric Hoist Bulletin. A bulletin containing complete information on the Wright Speedway Electric Hoist, including inside facts on the many features of this unit, is now available from the Wright Mfg. Division of the American Chain & Cable Co., Inc., York, Pa., free upon request.

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Of course you can—with a "Hardsteel" drill! You can drill hardened steel of any analysis and any hardness, without annealing and without special equipment. You can drill spring steel after hardening, drill dowel holes in hardened dies, drill the hardest armor plate to any depth, drill hardened production parts at assembly to insure perfect alignment, and salvage expensive parts which in the past have been scrapped. Use "Hardsteel" drills to drill, countersink and counterbore, and ask us about "Hardsteel" reamers.

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Drilling Work-
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"Detroit" Tap Reconditioner. How tap life and efficiency can be greatly increased by means of the "Detroit" Tap Reconditioner is described in a four-page illustrated bulletin now being issued by the Detroit Tap & Tool Co., 8432 Butler St., Detroit, Mich. The operation of the tap reconditioner in chamfering, spiral pointing, and polishing spiral points is described and illustrated, both in its relation to the machine construction and application. Copy of Bulletin No. TR-42 free upon request.

Bowen Lubricating Systems Catalog No. 75. A 12-page catalog discussing in detail Bowen High Pressure and Low Pressure Hydraulic Automatic Lubricating Systems has been published by the Bowen Products Corp., Auburn, N. Y. Illustrations and diagrams of the various parts comprising each type of system together with installation charts are included in the catalog. Copy free upon request.

Watson-Stillman General Bulletin No. 110-A. The many ways in which self-contained, high speed hydraulic machinery and equipment can help speed pro-

duction are pictured and described in the 44-page Watson-Stillman General Bulletin No. 110-A now being distributed by the Watson-Stillman Co., Roselle, N. J. The bulletin is printed in two colors, blue and black, and has a heavy laminated protective cover. For greater reader convenience, the bulletin is divided into two sections.

Section 1 contains 61 large photographs of hydraulic presses, pumps, jacks, and high pressure valves, with complete descriptive information as to type of unit, use, operating characteristics, dimensions, and other useful information.

Section 2 includes selective engineering tables on "Capacities of Hydraulic Rams," "Medium Carbon Seamless Steel Pipe," "Moments of Inertia of Rectangles," "Circumferences and Areas of Circles," "Conversion Tables," "Specific Gravities and Weights," "Strength of Materials," and so on. A limited number of individually bound copies of this section are available for distribution to engineering departments.

Copy of Bulletin No. 110-A or the engineering tables will be sent free of charge to anyone addressing a request on a company letterhead.

Chambersburg Pneumatic Forging Hammer Bulletin 1275. In this 14-page illustrated bulletin, publication of the Chambersburg Engineering Co., Chambersburg, Pa., the advantages, ratings and working capacity, and general specifications of the Chambersburg Pneumatic Forging Hammer, motor-driven type, are discussed in detail. A diagram showing the various parts comprising the assembly of this tool is also included. Copy free upon request.

"Metal Sawing" is the title of a 12-page bulletin illustrating and describing the complete line of high duty, hydraulic, automatic, metal sawing machines marketed by the Peerless Machine Co., Racine, Wis. Designated No. 50, the bulletin includes precise information on the important and exclusive features of design contributing to the unusual performance of these machines and the special equipment available for them. Drawings showing the various types of work encountered in the metal sawing field such as irregular sections, pipes, rounds, squares and forgings are also contained in the bulletin. Copy free upon request.

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Invest
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Scherr Magni-Ray. The George Scherr Co., 130 Lafayette St., New York, N. Y., is now issuing a four-page folder fully describing the Magni-Ray, an illuminated magnifier especially developed for close inspection of all parts used in airplane construction. The folder illustrates the Magni-Ray in use for maintenance and repair work, inspecting riveted and welded work, and for the inspection of small screw machine parts, stampings, spark plugs, and other components used in constructing airplanes. Copy free upon request.

"You Must Save Rubber." To further assist manufacturers and users of industrial rubber products in the conservation of such materials, The B. F. Goodrich Co., Akron, Ohio, is now issuing through its industrial products distributors an 11 x 17½-in. wall poster entitled "You Must Save Rubber." The poster, which has metal eyelet for easy hanging, includes, under eight subheadings, condensed, simple rules for the conservation of industrial rubber products.

Handy & Harman Low Temperature Brazing News. A bulletin on the subject of tool brazing and repairing by means of Easy-Flo brazing alloy is now being issued by Handy & Harman, 82 Fulton St., New York, N. Y. Copy free upon request.

Invest regularly in Defense Bonds and Stamps.

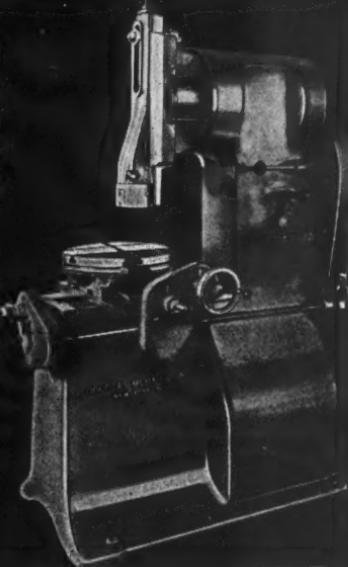
Progressive Standard Pedestal Welder. The Progressive Welder Co., 3017 E. Outer Drive, Detroit, Mich., is now issuing a four-page bulletin describing the design and operating features of its standard pedestal welder. In addition to describing the operation and design of the welder, the bulletin also embodies a number of illustrations showing how, through the application of special fixtures, and so on, specialized spot welding operations may be performed on this standard pedestal welder. Copy of Bulletin No. 501 free upon request.

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FOR TOOLROOM AND PRODUCTION

Swiveling ram head and tool holder, automatic circular table and independent automatic feeds in all directions.

Prompt Delivery
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Large-Scale Production

Built with
7", 8", 10"
Stroke



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Film on Blueprint Reading

A practical method for training shop workers in blueprint reading is introduced in a new two-reel sound film completed by Film Productions Co., 3650 N. Fremont Ave., Minneapolis, Minn. The film introduces a new technique called the "Read-Check-Read" system which not only enables the apprentice mechanic or experienced worker to grasp quickly the principles of blueprint reading, but to apply them in a systematic way. The unique method speeds up instruction in this vital matter by showing ways of concentrating on single factors of importance in each drawing or blueprint.

The film shows by animated drawings and special photographic effects many things difficult to explain in a text or by personal instruction. The film is prepared so that both reels may be used for a complete sequence or either reel used independently. The first reel is an introduction to simpler ways of reading blueprints; the second reel is designed to increase the ability of men already familiar with blueprints.

Information concerning the films is available upon request.

HANDY RACKS



Now available in 4-Arm, 51" high or the new 5-Arm Racks, 57" high. Used wherever flat or round bar stock or tubing is kept—factories, warehouses, schools, large and small shops. Four times the usual capacity for the floor or height space. Low cost, and money or space saved.

Send for priced circular.

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GRAY, Originator of First
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Most modern Nibbler for Tem-
plate Cutting, Tool Rooms,
Shipbuilding, Aircraft Parts,
Aircraft Tubing, Sheet and
Plate Shops.

GRAY MACHINE CO.
Box 596, Philadelphia, Pa.

"The Inside of Arc Welding"

Six one-reel, all-color sound motion pictures designed to help speed war efforts through the faster and better training of welding operators are now under production for the General Electric Company. Entitled "The Inside of Arc Welding," the films are being produced by the Rapheal G. Wolff Studios, Hollywood, who have evolved a new technique for picturing this difficult subject in a dramatic and highly interesting manner.

When completed, the pictures will be made available to public, private, and industrial welding schools, as well as to other interested groups. The first of the pictures covers the fundamentals of arc welding and is scheduled for general release about April 20. The other pictures will be available about June 1 and will deal with technique of arc control and electrode manipulation for all welding positions, using both direct and alternating current equipment.

Since they will show just what actually goes on inside the arc, the "Inside of Arc welding" pictures should be of great interest to the expert welder as well as the beginner. Through the application of new methods of lighting, the all-color pictures will show the electric arc in operation, revealing details of the arc and crater.

Ingenious animated cartoons and actual welding shots will be combined to add punch to the treatment of the subject. Featured in the cartoons will be "Joe Magee, the Welder," a timid but likable character created by Hollywood especially for the job.

Information as to how to obtain the pictures will be supplied by the Visual Instruction Section, Publicity Department, General Electric Co., Schenectady, N. Y., or the nearest General Electric office or arc welding distributor.



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HEADS OR TAILS —

You win!

UNBRAKO

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*famous for years as the
KNURLED SOCKET HEAD CAP SCREW
with no premium price!*

Heads you win a definite speed-up on the assembly line or wherever cap screws are used. The "Unbrako" knurling gears right to the fingers... prevents annoying, time-wasting finger slip... permits faster and farther turning of the screw before applying wrench! Because of this time-saving advantage, and because the knurling also permits quick and easy locking of the screw after countersinking, many plants are now standardizing on Knurled "UNBRAKO" exclusively. Make your next order Knurled "UNBRAKO" too!



Knurling of Socket
Screws originated
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SELF-LOCKING

HOLLOW SET SCREWS

Tails you win Holding Power—famous characteristic of "Unbrako" Self-Lockers with the knurled points! Set them up with no more than average pressure and they automatically lock into place—stay gripped regardless of vibration. Saves maintenance costs, helps to prevent costly breakdowns and delays. Easy to apply or remove and you can use them repeatedly.

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FOR YOUR CATALOG LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. **Turret Lathe**
Catalog No. 27-A contains full description and detailed illustrations of Oster No. 601 Turret Lathe. Oster Mfg. Co., Cleveland, Ohio.
2. **Honing**
Micromatic Hone Corp., Detroit, Mich., has issued Microfinish Bulletin AR-57.
3. **Handbook of Special Steels**
A comprehensive, 128-page book on the properties, uses and best methods of handling treatment, etc., of tool, stainless and other alloy steels has been published by Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pennsylvania.
4. **Milling Cutters**
A 24-page catalog covering the complete line of Lovejoy Milling Cutters has been issued by Lovejoy Tool Co., Springfield, Vt.
5. **Bandsaw Guides**
Paddock Tool Co., 1418 Walnut St., Kansas City, Mo., has issued details on Paddock Bandsaw Guides.
6. **Straightening Presses**
Lempco electric and hydraulic straightening and bending presses of 0 to 50 tons and 40 to 60 tons capacity respectively, are detailed in bulletins available from Lempco Products, Inc., Bedford, Ohio.
7. **Dynetric Balancing Machines**
The subject of balancing is interestingly treated in an illustrated 32-page booklet available from Gisholt Machine Co., 1219 E. Washington Av. Madison, Wis.
8. **Pneumatic Bar Feed**
Details on the Lipe Pneumatic Bar Feed which can be installed on a screw machine having a fixed stop, available from Lipe-Rollway Corporation, Syracuse, N. Y.
9. **Profile Grinder**
Circular illustrating and describing the Boyar-Schultz Profile Grinder No. 1 for grinding odd and irregular shapes may be obtained from Boyar-Schultz Corp., 2120-G Walnut St., Chicago, Ill.
10. **Portable Vibratrest**
Industrial Engineering Co., Inc., 11 W. Jackson Blvd., Chicago, Ill., has issued folder detailing the Vibratrest for vibration tests for all parts or articles up to 10 lbs.
11. **Motorized Hopper Units**
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"Continuous Filing." A descriptive four-page folder on "Continuous Filing" has been prepared by Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis, Minn. The folder includes illustrations and specifications of the Continental Bench Model FM Filing Machine and Floor Model FC Band Filer. Copy free upon request.

"Buffalo" No. 22 Drill. A 12-page bulletin illustrating and describing in detail the improved "Buffalo" No. 22 Drill is now being issued by the Buffalo Forge Company, 388 Broadway, Buffalo, N. Y. Special equipment available for the No. 22 unit is also covered and complete specifications are listed. Copy of Bulletin No. 2989-D free upon request.



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The Pittsburgh Segment Saw. An eight-page catalog regarding the Pittsburgh Segment Saw is now being issued by the Pittsburgh Saw & Tool Co., 75 Sycamore St., Pittsburgh, 23, Pa. The catalog illustrates the tongue-and-grooves method with wedges by which the segments of the saw are held to the plate. A list of specifications for Pittsburgh segment saws in sizes ranging from 14 to 60 in. in diameter is included. Copy free upon request.

Nice Ball Bearings Catalog No. 110. In this 66-page illustrated catalog, the complete line of ball bearing equipment marketed by the Nice Ball Bearing Co., 30th and Nicetown Lane, Philadelphia, Pa., is listed. This equipment includes radial ball bearings, thrust ball bearings, combination type ball bearings, ball retainers, casters, ball bearing wheels, steel, bronze, monel, and stainless steel balls, and special type ball bearings. A table of tolerances of Nice ball bearings is given at the back of the catalog, copy of which will be sent to any mechanical executive upon request.



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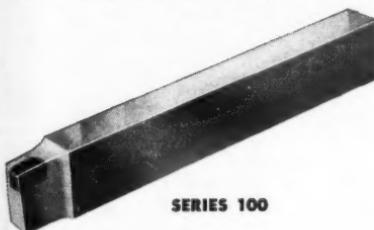
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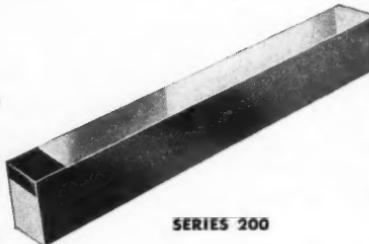
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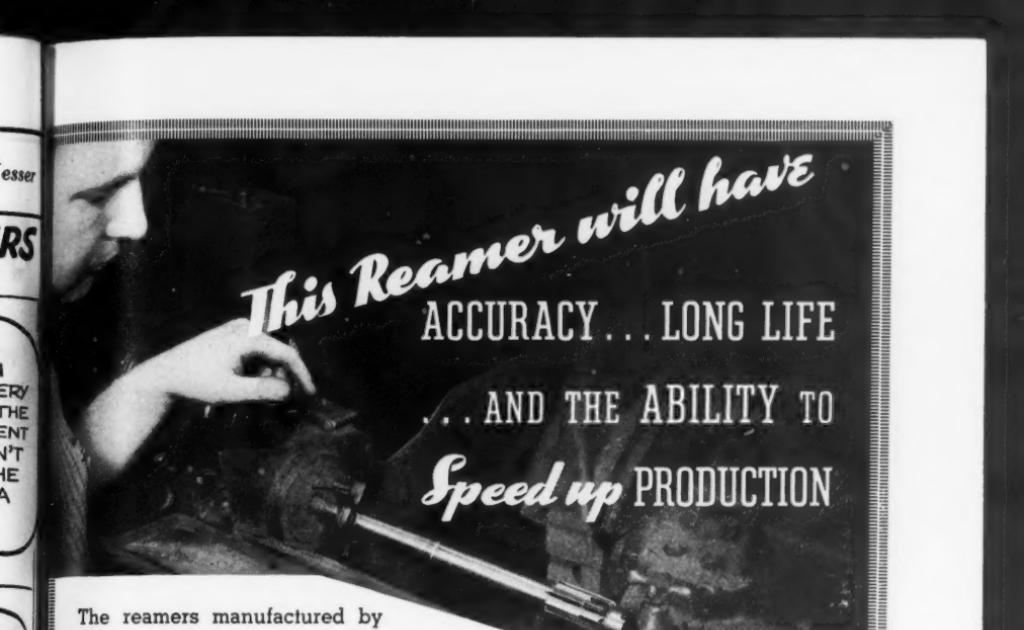
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Gwilliam Bearing Catalog No. 17. The 16-page catalog, issued by The Gwilliam Co., 359 Furman St., Brooklyn, N.Y., describes the Gwilliam line of roller thrust, ball thrust, step, journal roller, industrial roller, and special bearing. The various types are clearly illustrated and standard sizes are listed in tabulated form. Copy free upon request.



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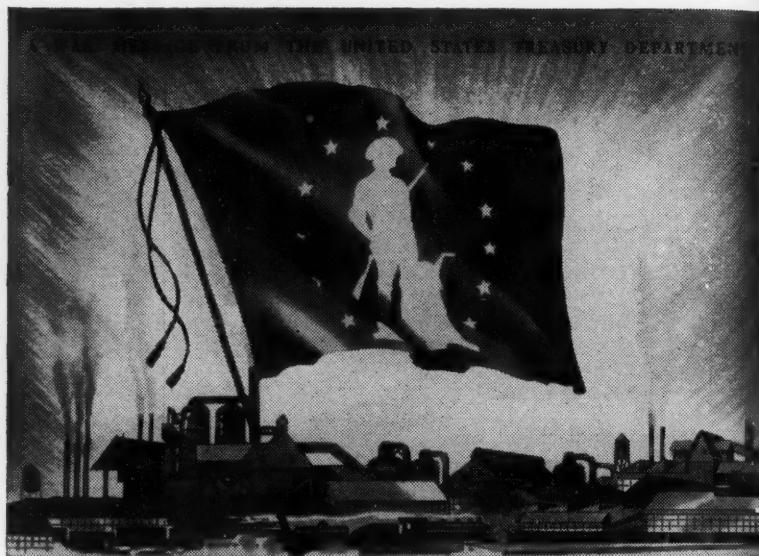
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in the Pay-Roll Savings Plan**

IT doesn't go into the smoke of battle, but wherever you see this flag you know that it spells Victory for our boys on the fighting fronts. To everyone, it means that the firm which flies it has attained 90 percent or more employee participation in the Pay-Roll Savings Plan . . . that their employees are turning a part of their earnings into U. S. Savings Bonds *regularly*, every pay day, with the goal being 10 percent of the gross pay roll allotted to Bonds. You don't need to be engaged in war production activity to fly this flag. Any patriotic firm can qualify. For facts about the Pay-Roll Savings Plan, write Treasury Department, Section D, 709 12th Street, NW., Washington, D. C.



MAKE EVERY PAY DAY "BOND DAY"

U. S. WAR Bonds • Stamps

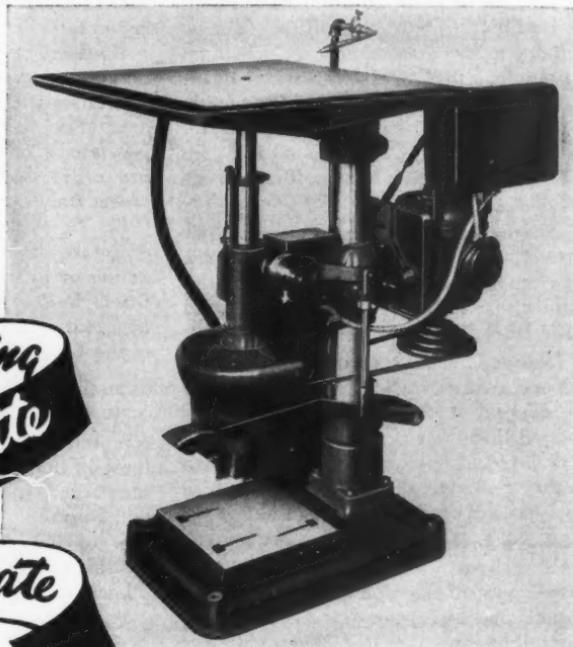
This Space is a Contribution to Victory by MODERN MACHINE SHOP

DSS-BP-4a

16-27878-1

U. S. GOVERNMENT PRINTING OFFICE

Here's **MECHANIZED SPEED**
for your Back Spot-Facing



Time Saving
Accurate
Easy to Operate

Slow hand operations are eliminated by the new, efficient Buffalo machine for back spot-facing, back counter-boring and back finishing of areas surrounding previously drilled holes. Table has large working area. Convenient foot feed, which actuates motor "plugging" control. When foot feed is released the spindle is stopped. Efficient coolant system. The Buffalo BACK SPOT-FACING Machine may be fitted with several types of operating switches. Bulletin F-3322 on request.

BUFFALO FORGE COMPANY

388 BROADWAY

CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONT.

BUFFALO, N. Y.

Buffalo

**BACK SPOT-FACING
MACHINES**

The Last Word . . .

SPEAKING before the National Association of Manufacturers and the Illinois Manufacturers' Association in Chicago, last month, J. S. Knowlson, Director of Industry Operations of the War Production Board suggested an order to end all orders. He said "Of course it won't be done, but if it were done, it might go something like this:

"Whereas, it is evident that the Axis Powers, hereinafter referred to in this order as the Customers, are the important recipients of military materials produced in the United States, and

"Whereas, in order to maintain and increase direct deliveries to the Customers the people of the United States have pledged that their principal activity shall be the production and delivery of such military materials until the termination of sales resistance by said Customers, and

"Whereas, in order to insure prompt direct delivery to said Customers the Government of the United States has arranged for assistance in making such direct deliveries from the Governments of England, Russia, China, Australia, and the other United Nations, and

"Whereas, it is understood that for the purpose of this order Direct Delivery shall mean any transaction whereby bombs, bullets, torpedoes, mines, shells, or other materials of an explosive or otherwise peculiarly dangerous character are delivered on, in, or near said Customers,

"Now Therefore, it is hereby ordered that each producer of such materials in the United States is exempted from all orders heretofore or hereinafter issued by the WPB and is granted a new Super-Drooper Preference Rating which provides that:

(1) Each producer shall devote all of his facilities to the most efficient and rapid

production of materials for Direct Delivery to the Customers, and

(2) Each producer transfer all material and equipment that he cannot so utilize to producers who can so utilize, and

(3) Each producer cooperate in every possible way with other producers who are processing or servicing material for Direct Delivery, and

(4) No producer shall take any action or refuse to take any action when such action or inaction will in any way delay Direct Delivery of any material which is necessary for the destruction on schedule of the Customer."

Signed

We believe that Mr. Knowlson has "got something there" and if every manufacturer in these United States will consider that order as applying directly to him, it will help to maintain deliveries, on schedule, of the American Brand of shells, bombs, and torpedoes to the Customers—otherwise known as the Axis.

We are now facing the greatest crisis in the history of the World since the Flood, and the outcome of that crisis now depends upon the people of the United States. A vast effort is being made by a fanatical, conceited Teutonic nation to accomplish the dream of emperors since the dawn of history—to enslave the rest of the world and set it to producing for the benefit of the "master" race. It now rests with the American people whether or not that effort shall succeed.

Every one of the great war tragedies since the fall of France—the loss of Singapore, the loss of the Philippines, the loss of Corregidor, the loss of the East Indies Islands—was due to the fact that the supply of men and materials was "too little and too late." If America is to remain a free and independent nation, we must produce more and faster.



Accuracy is basic...

1. IN AMERICA'S WAR EFFORT —
2. IN ABRASIVE SURFACE GRINDERS

ACCURACY IN THE TOOL ROOM — Accuracy in the tool room is essential to all machine production. Interchangeability of parts, the foundation of mass production, is impossible unless tools and dies are accurately finished. Hundreds of Abrasive No. 1 1/4 Surface Grinders are on active duty in tool rooms of plants in the thick of war production . . . Operators prefer them, first, because they are accurate and then because they are easy to operate and have an unusual capacity, 15" x 10" x 12" high . . . Management likes these hand operated grinders because they are less expensive in first cost, cost of operation, and cost of upkeep. Write for Catalog No. 1 1/4.

ACCURACY IN PARTS PRODUCTION — News reports of the daring raids of U. S. fliers against the Japs in the Philippines state that the planes used were salvaged from parts of many other machines wrecked in service. This is a tribute to American mass production and to the accuracy which made individual parts so completely interchangeable. Abrasive No. 3B machines are in use in the Nation's airplane engine, tank, munitions, and other shops finishing parts the accuracy of which is essential. Write for Catalog No. 3B.

ACCURACY IN MACHINE TOOL BUILDING — Only an accurately built machine can produce accurate work. Illustration shows an Abrasive No. 34 Surface Grinder with circular grinding attachment in our own shop helping to finish parts for Abrasive Grinders. This built-in accuracy has been responsible for the success of Abrasive Surface Grinders and the real reason why they have been ordered by so many other machine tool builders—both before and during this emergency. Write for Catalog No. 34.

ABRASIVE MACHINE TOOL CO.

EAST PROVIDENCE

• RHODE ISLAND, U. S. A.

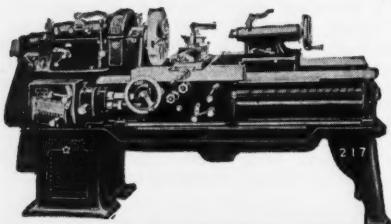
CINCINNATI

QUICK-CHANGE
GEARED-HEAD
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LATHES

Guaranteed for Workmanship, Materials and Performance

They need no introduction to experienced machine shop men. The many exclusive features enable the operator to reduce operating expenses and more than earn their cost in a short time. Our close co-operation with many of the leading plants everywhere has helped solve perplexing lathe problems for boring, turning or chasing any metal work always most economically.



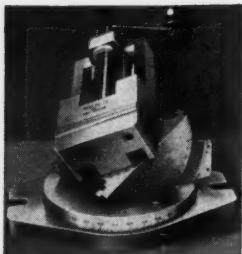
Latest catalog contains detailed specification on 14", 16", 18", 20", 22", 24", 27" and 30" sizes. With them are obtainable 32 to 100 changes of thread and feed; 12 to 24 spindle speeds to cover every shop requirement. Better to get trouble free operation with uniform precision.

*Designed and produced by specialists
since 1906.*

THE CINCINNATI LATHE & TOOL CO.

SPECIALISTS OVER 35 YEARS

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OAKLEY, CINCINNATI, OHIO



Universal Vise



Universal Angle Plate

The Quick, Easy Way to Set-Up Compound Angle

The WESSON UNIVERSAL VISE

Cuts set-up time; insures greater accuracy. Accurately graduated in all planes. Sturdy cradle design and steel construction give greater rigidity; permits faster stock removal. Two sizes, priced for every shop. Can be furnished with slotted surface plate for use as universal angle plate. **AVAILABLE FOR IMMEDIATE DELIVERY. SEND FOR FREE FOLDER.**

WESSON TOOL CO., Ferndale, Mich.
Please send me illustrated Folder covering the Wesson Universal Vise.

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July, 1942

MODERN Machine Shop

Lower
APP

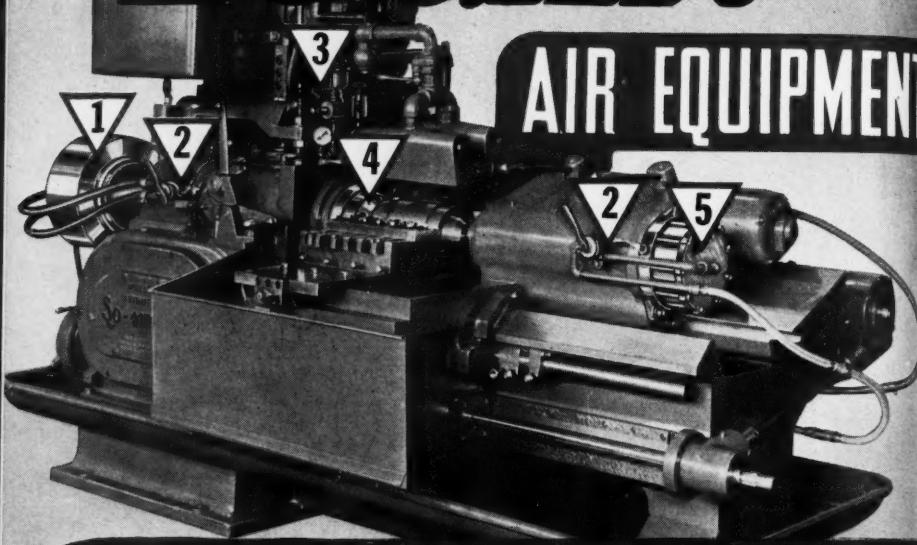
“United We Stand”

116
130



"LOGAN"

AIR EQUIPMENT



AS APPLIED TO SENECA FALLS *Lo-swing* LATHE

1. "Logan" Model "R" Air Cylinder
2. "Logan" Model "TL" Air Control Valve
3. "Logan" Reducing Valve and Air Filter Unit
4. "Logan" Six Jaw Expanding Mandrel
5. "Logan" Model "F" Air Cylinder



This Model R-14 Lo-swing lathe is used for the rough turning operation on radial motor cylinders for aircraft. The headstock is equipped with a "LOGAN" Model "R" Rotating Type Air Cylinder for the operation of a "LOGAN" Six Jaw Expanding Mandrel. The tailstock centering device is operated by a "LOGAN" Model "F" Non-Rotating Type Air Cylinder. Additional "LOGAN" Air Equipment consists of two "LOGAN" Model "TL" Air Control Valves and a "LOGAN" Reducing Valve, Automatic Lubricator and Air Filter Unit. "LOGAN" Representatives and Engineers will be glad to make recommendations on your problems.

LOGANSPORT MACHINE, INCORPORATED

901 PAYSON ROAD

Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

LOGANSPORT, INDIANA